

PIONEERS OF MOUNTAINEERING

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THE CONQUEST OF MOUNT KAMET

One of the climbers on the Summit Ridge approaching the photographer
while advancing towards the mountain-top

(Page 160)

Frontispiece

PIONEERS OF MOUNTAINEERING

BY

B. WEBSTER SMITH

Author of "True Stories of Modern Explorers", "Some
Triumphs of Modern Exploration", &c.

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To
My fellow-climber,
Florence May



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Preface

For the information upon which these narratives are based I am indebted to articles scattered through the periodical publications of the Alpine Club and the Royal Geographical Society. A few outstanding books have also been laid under contribution. My principal sources of information are as follows:

H. B. de Saussure, *Voyages dans les Alpes*; J. Tyndall, *The Alps and Mountaineering in 1861*, *Old Alpine Jottings*, &c.; E. Whymper, *Scrambles Amongst the Alps in the Years 1860-1869*, *Travels Among the Great Andes of the Equator*; John Ball and W. A. Coolidge, *The Alpine Guide*; D. W. Freshfield, "Sua-netia" (*Proc. R.G.S.*, 1888), "Peaks, Passes and Glaciers of the Caucasus" (*Proc. R.G.S.*, 1888), "Search and Travel in the Caucasus" (*Proc. R.G.S.*, 1890), "The Glaciers of Kangchenjunga" (*Geog. Jour.*, 19, 1902); E. A. FitzGerald, "Exploration on and around

Aconcagua " (*Geog. Jour.*, 12, 1898), *Climbs in the New Zealand Alps*; G. Rey, *The Matterhorn*; W. W. Graham, "Travel and Ascents in the Himalaya" (*Proc. R.G.S.*, 1884); Dr. and Mrs. Workman, *Icebound Heights of the Mustagh*, "Exploration of the Nun Kun Mountain Group and its Glaciers" (*Geog. Jour.*, 31, 1908, "The Hispar Glacier" (*Geog. Jour.*, 35, 1910); H. H. Johnston, "The Kilimanjaro Expedition" (*Proc. R.G.S.*, 1885); H. Meyer, "Ascent to the Summit of Kilimanjaro" (*Proc. R.G.S.*, 1890); T. G. Longstaff, "A Mountaineering Expedition to the Himalaya of Garhwal" (*Geog. Jour.*, 33, 1908); A. L. Mumm, *Five Months in the Himalaya*; W. S. Green, "Recent Explorations in the Southern Alps of New Zealand" (*Proc. R.G.S.*, 1884); G. W. Young, *On High Hills*; Sir W. M. Conway, *The Alps from End to End, The Crossing of the Hispar Pass, &c.*; A. F. Mummery, *My Climbs in the Alps and Caucasus*.

It has been found possible to dispense with many of the technical words in common use by mountaineers; but a glossary is given on p. 224 for the convenience of readers.

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PIONEERS OF MOUNTAINEERING

CHAPTER I

In the High Alps

The Alps are the spiritual home of the mountain climber. The word "Alps", however, is somewhat of a misnomer, for the true alps are high mountain pastures, clothed with grasses, gentians and many beautiful alpine flowers, bearing shingle-roofed chalets, and occupied by browsing cattle with tinkling bells, by goats, and by sturdy peasants in picturesque garb. The mountains which take their name from these alps extend in a great arc from the Mediterranean Sea near Nice to the outskirts of Vienna, a distance equal to that between Plymouth and Edinburgh; and their arrangement roughly resembles a double herring-bone which has been twisted and broken into fragments.

On the ribs of these herring-bones thousands

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of climbers annually pit their skill and strength against the might of the peaks; but although they are usually triumphant, some remain behind every year to swell a death-roll that now numbers hundreds. You may see the climbing fraternity on any summer afternoon clustered in the streets and hotels of Chamonix, Zermatt, or Grindelwald, recounting their exploits of the day before (much as a golfer who has just holed out in one), or considering their chances for the day in prospect (somewhat like a golfer who has had his handicap increased). In these districts the very roads are stacked with alpen-stocks and littered with coils of rope, while finger-posts point in all directions to lead the unwary away from the communal highway.

Far otherwise was it in the year 1760, when a young man took it into his head to penetrate into the mysterious hidden glens of the Alps, which were known only as the haunts of fogs, storms, uncontrollable torrents, and impassable ice streams, and moreover were reputed to be the homes of brigands and evil spirits. This young man was a Genevese, then only twenty years old; his name was Horace Benedict de Saussure. From the quayside of his native town he had looked across the blue waters of Lake Lemman at a blunt white cone, forty miles distant, which rose nobly above the intervening

mountains and dwarfed its immediate neighbours; and he had asked himself, "Can this Mont Blanc, monarch of the Alps, ever be ascended by mortal man?" To satisfy his curiosity he journeyed thither, bumping over the roads in the broken-down diligences which then, and for many years afterwards, were the only conveyances. This was the first of seven Alpine tours, which he described in a book that attracted the attention of all Europe to the Swiss mountains.

De Saussure, although still only a student, was a very observant young man, and was deeply interested in the question, Why are there such things as mountains? He thought that by examining them at close quarters, by scaling their scarred and frowning faces, by noting the way in which their rock layers or strata are deposited (which, in the Alps, often resemble the folds of a squeezed towel), and, in a word, by really studying them instead of theorizing about them, he might make some valuable discoveries. Incidentally, he was led to collect their plants and animals, to study the remarkable ice rivers which flick the mountain sides, and to make other researches of value. By doing all this he was bound to become something of a climber; and his most famous ascent was that of Mont Blanc.

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We have already said that he first visited the mountain in 1760. (A long, generally narrow and deep, winding valley, that of the Arve, empties into the Rhone at Geneva, its other end being the snows of Mont Blanc. (In this valley, underneath the mountain, was a small village, Chamonix, the seat of an ancient Benedictine priory.) The place was almost unknown, and there were no guides (in the modern sense) at all. Nobody had ever been to the top of the mountain; and although two Englishmen had reached the foot of its glaciers some years earlier they were forced to stop there; for the glaciers of Mont Blanc have a particularly formidable aspect, being riven into countless small pinnacles of ice, separated by a maze of deep blue cracks or crevasses. De Saussure took one look at this unpromising region, and thought, "Impossible".

- He went back to Geneva. Soon afterwards he was appointed to a Professorship of Philosophy there, but in the intervals of teaching he continued his tours among the Alps, with which he gradually acquired a great familiarity. He had the soul of a poet and the eye of an artist. At the back of his mind during all his journeys was one thought, "Can I ever get to the top of Mont Blanc?"

Twenty-six years later (1786) the thing was

done. A Doctor Paccard, accompanied by Jacques Balmat as guide, successfully ascended Mont Blanc in the month of August. Where one man could go another could follow. The prize long dreamed of had been snatched away; nevertheless next year de Saussure went again to Chamonix in order to attempt the ascent.

The conquest of Mont Blanc in these days is so easy that nothing need deter one from doing it except the expense. Expert climbers either boast of never having done it at all, or else they vie with each other in reaching the summit in the shortest possible time. But in 1787 (and even in 1857, when another famous ascent was made) it was a vastly different matter. There were no huts at convenient points, no iron supports, no well-trodden and recognized ways. Apart from Paccard's exploit it was virgin territory; and yet it seemed quite clear and easy, if only one could overcome the dangers of the glacier and the cold.

Let us try to form a picture of this famous peak.

Chamonix lies deep in the valley, with the mass of Mont Blanc on its southern side and a lesser mountain, the Red Needles (Aiguilles Rouges) on the opposite side. If we climb up by the Red Needles, a footpath through the woods brings us to a rocky eminence called the

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Flegère, some 3000 feet above the village. From this point the two main approaches to Mont Blanc may be seen. Directly opposite is the steeply descending part of a great glacier, the Mer de Glace or Sea of Ice, its surface curiously banded with stones and mud, besides being scarred by a thousand fractures. It curves round to our right, out of sight, whence a higher ice stream, the Giant's Glacier, leads on to the peak. Looking across the village far below, we see above it, and seemingly much nearer than the nine miles which is its real distance, a blunt snowy cone, whence an ice stream, broken into shelves or benches, runs straight down to within a short distance of our valley. Beside Mont Blanc, and also very high, is a large white mass, called the Dôme du Goûter; and between the straight glacier (known as the Glacier de Bossons) and the Mer de Glace we face a mass of rugged spires, the celebrated Needles of Mont Blanc. These sharp summits have tested the powers of the most experienced climbers, and have been responsible for many a fatal accident. There is no need to go over them in the climb, however, for either of the icy avenues affords an easy means of approaching the summit.

This was the scene which met de Saussure's gaze on that July afternoon in 1787. Immedi-

ately afterwards mist and storm enveloped everything, and a protracted spell of bad weather imprisoned him at Chamonix for a month. He persevered in his resolution, however; the weather improved at last, and on 1st August he set out to achieve his life's ambition, accompanied by a servant and an army of eighteen guides.

The expedition occupied four days, on the first of which they clambered up the wall of the valley and camped as high as possible before taking to the ice. On the second day they crossed the scarred surface of the glacier to some rocks, the first of a succession which led up in sharp points towards the summit; but they were forced down again to a snow-covered hollow, up which a way was found among the gaping clefts and over the frail snow bridges that arched them. He took ladders, armed with steel points at the ends; these could be thrust into the ice on the far side of a crevasse, and over such bridges the men passed one by one, with nothing but blue space beneath. Of course they were roped together. Only the day before one of the guides had tumbled into a crevasse, and but for the fact that he was roped to others he must have perished.

De Saussure foresaw what is now an essential principle of mountaineering; he knew that

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if a high summit is to be reached, the actual ascent must be made from the highest possible point, so as to allow sufficient daylight hours for the climb and also the subsequent descent to safety. For this reason he wished to camp high up on the middle snowy plateau of Mont Blanc; but the guides, who had never heard of such a thing, were afraid lest they should be frozen to death there. De Saussure prevailed. After clambering toilsomely over the chaos of shattered ice and stones that recent avalanches had spread over their route, they reached the desired spot, almost 12,000 feet above the sea; and the guides were set to work to level out a tent floor. To his astonishment they seemed greatly affected by the altitude, being exhausted after the removal of a few shovelfuls of snow. When the tent was erected they closed every chink in it so carefully as to make the air inside seem stifling; so the scientist, who loved fresh air, sallied forth into the ghostly stillness of the starlit night. There, by the weird half-light, he saw the black shapeless masses of the great Needles frowning down upon him like spectres, while the white line at his feet, which was to convey him to unknown hazards on the morrow, disappeared mysteriously in the gloom. Far above, wrapped in that solitude which is the privilege and pain of majesty, was the sum-

mit on which, for seven and twenty years, he had dreamed of standing. He went back to the tent and tried to sleep; but in the middle of the night all were disturbed by a loud crack, as an avalanche tumbled down to the glacier below them.

In the morning, everything being hard bound by frost, they could get no drinking water. The process of melting snow is a slow one; hence they started late. Slowly ascending, without much danger or any notable incidents, they reached the base of a slope which was inclined at an angle of nearly 40 degrees; a slip here would have meant tumbling over a precipice on to the ice spikes below, but it was safely surmounted. They then had only a gentler incline to face, which led to the summit 900 feet above; and in two hours more twenty pairs of feet were standing on that large expanse, 15,780 feet above the sea. It was a snowy plateau, with not a rock in the vicinity. So deep is this snow-cap, in fact, that when Dr. Janssen built an observatory there, 106 years afterwards, he could find no rock for his foundations, even at a depth of forty feet.

The view was magnificent. They could look uninterruptedly across the Gran Paradiso towards Lombardy on the one side and past the philosopher's native lake and town, and the

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distant Jura Mountains on the other. But de Saussure had not gone to the top of Mont Blanc merely to admire the view. He had his table set in the snow, and began several hours of experiments, besides finding the altitude; he was surprised to find that he worked slowly and seemed fatigued, as a result of the rarification of the air.

Their descent proved easy and uneventful, except at two places. The first was the steep slope already mentioned, where the sun had melted the snowy covering of the glassy ice, so that it was ready to slip at a touch and to carry the climbers with it. The second was among the crevasses of the glacier; one snow bridge that had to be brought into service was only three inches thick. Eventually, however, all the party got safely back to the village, and the first notable piece of scientific mountaineering had been done.

De Saussure left a ladder beside the rocks high up on the mountain. It was discovered forty-four years later, having travelled down with the ice almost three miles, or an average of eleven inches every day. Why was this? And what are these extraordinary ice rivers? They have formed a fascinating subject of study to many a bold climber, from de Saussure's day to the present; but very few people have had

as close an acquaintance with them as the man who, seventy years after the historic ascent of Mont Blanc in 1787, again planted an axe on its crest. This man was also a professor, his name John Tyndall. Originally a railway surveyor, he had saved enough money to learn physics and mathematics at a German university; in the year 1856, when he first saw the mazes of the Mer de Glace, he was about to succeed the famous Faraday at the Royal Institution.

Tyndall soon became vastly interested in glaciers. His first excursions upon them were made with guides, and he never despised the aid of a guide; but eventually he acquired such proficiency in icecraft that he would venture where even his guide would not dare to follow. He was as tough as the ash of his stick, spare of build, a modest eater, indifferent to heat or cold. Wherever he went his wonderfully penetrating eye spotted beauty in commonplace things—the glory of a rainbow, the wonders of a snow crystal, the spectral shadows cast by human beings upon a wall of fog; and he knew how to describe these things in most simple and delightful language. Later, his love of mountains led him to undertake some very notable ascents, as we shall see; for the moment, however, let us plant ourselves in

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imagination, upon one of those rivers of ice, known as glaciers, and see what we can make of it.

If we imagine a mountain side to have a hollow in it which is above the level of perennial snow, the hollow will soon become filled with the white powdery needles and exquisite six-leaved flakes. By their weight successive snow-falls will make the lower layers more compact, until in time refreezing and other processes transform them into ice. We may frequently see such layers by looking at the sides of crevasses near the glacier's head; but they are often contorted by the severe pressure to which the ice has to submit. Eventually the ice will flow out of our hollow on to the mountain-side, and what more natural course for it than to descend some gully or ravine which has been cut by the torrents due to its own melting? Its frozen end or *snout* is pushed ever lower by the weight from above; and so our young glacier now comprises two distinct parts—a basin at its head, where the snow accumulates, and which is called the *névé*; and the trunk or *tongue* which is descending the valley.

When we stand upon such a glacier we are conscious of no movement, yet the great mass is always in motion. Its snout may be still for months on end, or it may even melt away to-

wards the snow basin; nevertheless the motion of the ice particles goes on incessantly. This can be proved in a very simple way, as has been shown by Tyndall and many others. If a line of posts is set up straight across a glacier, we shall find that in a few days those in the middle have advanced perhaps several feet, whereas those near the edge have scarcely moved. Not only does the top move like this, but the entire frozen mass (which may be twenty miles long, two miles wide, and several hundred feet thick) is in motion, as Tyndall proved by a very daring experiment. He allowed himself to be lowered to the bottom of a crevasse on one of the Mont Blanc glaciers, between some rocks and the ice, the depth being equal to the space between the floor of an average church and the weathercock on the steeple. The loose rocks at such places are constantly tumbling, from bits like small shot up to boulders weighing tons; but despite the danger of being hit Tyndall succeeded in fixing three pegs in the ice, one within a yard of the base, a second thirty-six feet up, and the third at the top. In twenty-four hours the uppermost peg moved $5\frac{1}{2}$ inches, the middle one 4 inches, and the bottom one only $2\frac{1}{2}$ inches. Friction therefore affects an ice river just as much as it does a river of water; the motion being greatest

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at the top and in the deepest part, and least at the bottom and sides.

Our reveries, when standing on a glacier, are frequently disturbed by unearthly groans, creaks, and cracks. Although the brittle mass moves so much it does not move readily, and breaks in it occur incessantly, which widen until they become formidable crevasses like the ones de Saussure had to cross. Their lips are white, but blue ice lies below; and if we look down into their gloomy depths we cannot discern the bottom. We may hear beneath our feet, however, a rattling and gurgling noise, which is due to some furious torrent forcing its way along between the rocky floor and the walls of an icy tunnel; at other points we may see the water pour down crevasses like a waterfall. Woe betide the wanderer who should fall, when alone, into such a crack; even if the fall did not kill him, the bitter cold and perchance even drowning would bring him to a speedy end.

We can now return to Tyndall's ascent of Mont Blanc. In the seventy years since de Saussure's time mountaineering had become firmly established. The Jungfrau, the Wetterhorn, and many other peaks had succumbed to ardent climbers, as had the principal summits of the Pyrenees. The Alpine Club, the first

society organized for prosecuting that art, was about to be founded, with a noted climber, Mr. John Ball, as its first president. Tyndall himself had spent the leisure of two years in qualifying as an alpinist and ice-man. He had not yet ascended Mont Blanc, although his work had mostly lain around it; but he made his first attempt on the morning of 12th August, 1857.

By this time qualified guides existed. There were also two huts available, one at the Pierre à l'Echelle (Ladder Rock), a prominence well up on the Bossons Glacier, and the other still higher, on some rocks known as the Grands Mulets (Great Mules); at the latter climbers spent the night prior to making the final ascent. The professor was accompanied by another learned man, Professor Huxley, also their friend Mr. Hirst, and Eduard Simond as guide.

They followed the Glacier des Bossons route, clambering over the hillside above Chamonix, and painfully picking a way among the great blocks and loose stones at the base of the savage Needles. At the Pierre à l'Echelle they were given a ladder with which to negotiate the crevasses, also woollen gaiters to keep out the snow. They then began to cross the glacier to the other hut, having great difficulty with the crevasses. The spiky surface of the ice was

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also treacherous. Tyndall stepped on a granite block that rested on such a spike, and it slipped, carrying him down and injuring his hand. Some crevasses could be crossed only by driving in the spikes of the ladder and then crawling over. At another it was necessary to step boldly on to an overhanging mass of snow, after the guide had beaten it down to harden it. "I was the lightest of the party," remarked Tyndall, "and therefore tested the passage first; being partially lifted by Simond on the end of his axe, I crossed the fissure, obtained some anchorage at the far side, and helped the others over."

This sort of work was harrowing both to muscles and nerves, and Huxley became obviously tired. On reaching the upper hut it was decided that he had better stay there while the others continued the ascent. There was a stove in this refuge, which they lit with wood that they had carried up; but they had forgotten candles and had no other light.

Mountaineering is no sport for a heavy sleeper. At one o'clock in the morning Tyndall woke the others, and breakfast was prepared by the fleeting and uncertain light of successive matches; then the three who were to go on shook hands with their comrade and vanished in the outer darkness.

It was still not 2.30 a.m., and they had

difficulty to avoid falling into crevasses; but presently the first pale streak of dawn crept out, to be followed by a varied blaze of colours peculiar to this region; yet it was long before the sun tinted the peaks or warmed their blood. Simond had only been to the top of Mont Blanc once, and unfortunately they bore away from the true route, keeping to the right under the ice cascades of the Dôme du Goûter; this landed them in incessant difficulty with the crevasses, one of which it took half an hour to cross.

They reached the first of the three plateaux by an avenue of snow, with towers of ice tottering above them on one side and a great gaping crack beside them on the other. At the flatter places they sank to the hips in snow; on the steeper ones it was difficult to keep a footing. Thus the hours slipped by, and when they had only gained the second or Grand Plateau the sun came out. After crossing this place they found themselves at the base of a steep slope, apparently the same which delayed de Saussure; its frozen surface hid soft snow, beneath which was hard ice. The guide was now showing signs of weariness, and so Tyndall took the lead. "To render my footholds broad and sure," he recounts, "I stamped upon the frozen crust and twisted my legs in the soft

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mass underneath—a terribly exhausting process.”

Eventually, however, they reached the base of the Rochers Rouges (Red Rocks), a prominent point where a dangerous snow bridge had to be crossed; then over a slope of firm ice without any foothold at all: here the ice-axes came into play, the guide, Tyndall, and finally Hirst, cutting steps in turn, while the others stood shivering in their places, unable to move either up or down. It took Tyndall just an hour to cut sixty of these steps. Higher up the slope became easier, but at some times three hours' step-cutting might have been involved; on this occasion, however, the party rushed the incline, holding on by the nails in their boots and the spikes in their axes. When this dangerous obstacle had been overcome Simond threw himself down on the snow, exhausted, exclaiming: “We must give it up.” He recovered after a short rest, however, and they went on.

There were only two lots of rocks between them and the summit now, small islets set in an icy frame. At the lower patch they halted and finished their meagre fare, while Tyndall filled their empty bottle with snow so as to have a drink on their return. It was now half-past two in the afternoon, and they had been continually ascending for twelve hours; in the

ordinary course they should have been nearing the hut on the return journey. Nevertheless they determined to continue forward for one hour longer.

The altitude now began to tell on them, and they frequently halted to gasp for breath. "At each pause my heart throbbed audibly, as I leaned upon my staff," says the Professor; when it ceased to throb he started up again. This persistence won its own reward; for at 3.30 they stood upon the broad summit ridge, admiring the billowy masses of snow-white clouds beneath their feet.

Tyndall now tried an experiment to determine whether the noise of an explosion in rare air was as great as in the dense air near sea level. He had brought with him a little tube of gunpowder, which he placed in the snow and fired; at the second attempt it tore open the case, the sound (as had been expected) being feebler than if he had exploded it at Chamonix. On a subsequent ascent of the same peak two years later he fired a pistol from the top; this confirmed his previous result. The noise "resembled somewhat the discharge of a cork from a champagne bottle, though much louder".

The three men, tired and hungry as they were, did not linger long on the top of Mont

Blanc. Cautiously descending the perilous places they reached the maze of crevasses once more; but the snow bridges had now been subjected to the sun's heat all day, and it was with quaking hearts that the trio ventured upon them. Once while they were descending a steep incline the snow slipped and Hirst went with it. Tyndall, who was next on the rope, tried to check his fall, but was carried along helplessly in "a flurry of snow, in which we were almost completely hidden at the bottom".

All the worst dangers were now past, however, and they soon reached the anxious Huxley, who had spent several painful hours imagining what might have befallen them. The next day both Hirst and the guide suffered from snow-blindness, an exceedingly painful complaint which makes it impossible to open the eye-lids without agony; it is fortunately only temporary, being soon cured by the application of a special lotion. Under these circumstances Tyndall had to shepherd his flock down the slopes of the lower glacier to terra firma.

Next year he made a very difficult ascent, the Finsteraarhorn, besides the first ascent of the Weisshorn, another hard climb. On the way down from the former peak his guide slipped, pulling Tyndall down after him. The Professor had improved since his Mont Blanc

days, for he says: "I fell also, but turned quickly, drove the spike of my hatchet into the ice, got good anchorage, and held both fast." It is this power of instantaneous decision, followed by immediate action, which marks the outstanding climber; such qualities often prove his salvation when a moment's doubt would mean his doom.

In 1858 Professor Tyndall also ascended Monte Rosa, the Queen of the Alps, and the second highest peak in Europe. Its four summits rise from an angle in the Swiss-Italian frontier, with deep gorges on the Italian side; but when viewed from the Swiss valleys it has the aspect of an ice-barred castle; ridges advance from its long crest, holding between them the Monte Rosa Glacier; and on the far side of these ridges other large glaciers separate the mountain from more high peaks. The easiest way up is by means of the eastern ridge, between the Monte Rosa and Grenz Glaciers. Monte Rosa had been first conquered three years before Tyndall's ascent, by two famous guides, Ulrich Lauener and Johann Taugwalder, piloting a party which included a celebrated amateur, the Rev. Charles Hudson.

Tyndall was accompanied by a brother of Lauener, who had not himself ascended the peak; but they had the advantage of Ulrich's

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company and advice during the traverse of the lower glaciers. They then bade him good-bye and were left to their own devices.

The route led easily across the middle of a great glacier to the base of the Monte Rosa Glacier, and then up that ice stream towards the peak, an easy walk, bereft of incident. The sun shone full on the rocky points of Monte Rosa ahead; but behind them the gaunt finger of the Matterhorn was buried in cloud, and as the morning wore on peak after peak became enveloped, while wisps of mist played around Monte Rosa itself.

Rising steadily up the slope, they came at length to a place where the eastern ridge began to assert itself, very precipitous and narrow; and as they clambered up this ridge, Monte Rosa Glacier sank away on their left hand, and the large Grenz Glacier on their right. Still farther to the right was the precipitous face of the Lyskamm Mountain, down which rocks and small avalanches fell incessantly. Great billowy clouds, wrapping round the face of the Lyskamm, crossed the glacier to Monte Rosa, crept insidiously down the ridge and slowly enfolded the climbers.

The ridge was what is known as a Comb, being greatly serrated, but the spaces between the teeth were largely smoothed out by thick

pads of snow and ice; the slope on both sides of it was extremely steep, that on the left being like a house roof, but broken by minor cliffs, while that on the right descended sheer to the Grenz Glacier thousands of feet below. Thus, although they were now fighting their way up in mist, there was but one route to follow, for a divergence to either side meant immediate destruction.

They had to move with great caution. At one place they found that the Comb had resolved itself into an overhanging mass of snow, called a cornice; and although it bore them, their feet sank in it, while Tyndall's alpenstock went right through; when he withdrew the staff he looked through the hole at the clouds below! To add to their difficulties it now began to snow, but still they crept on. Another hour, and they were off the dangerous Comb, with their feet on firm rock again.

The way now became extremely rugged and steep, a succession of giant pillars and deep hollows confronting them; very formidable they seemed in the mist. "We advanced," says Tyndall, "sometimes with our feet on narrow ledges, holding tightly on to other ledges by our fingers; sometimes, cautiously balanced, we moved along edges of rock with

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precipices on both sides." Lauener dropped a book which fell some little distance, and while he was endeavouring to regain it Tyndall scrambled forward and reached the summit (15,215 feet).

The view, which from this point is usually magnificent, was singularly uniform, being nothing but grey clouds above, below, and all around, which shut off every object more than twenty yards away.

While they rested Tyndall consumed the cold tea and sandwich that formed his regular ration during such adventures; and his professional instincts were aroused by the remarkable appearance of the snow crystals which fell on his hat. "It was in fact a shower of frozen flowers. All of them were six-leaved; some of the leaves threw out lateral ribs, like ferns, some were rounded, others arrowy and serrated, some were close, others reticulated, but there was no deviation from the six-leaved type. Had a spirit of the mountain inquired my choice, the view or the frozen flowers, I should have hesitated before giving up that exquisite vegetation."

They descended through the mist and snow, taking every precaution to avoid a slip; but they were curiously joined, for although Tyndall, who led, had the rope tied round his waist,

Lauener had only slipped the loop over his shoulder. On the Comb the axe was driven in at every step, so as to afford some purchase should one or other of them fall; but they got over it safely, and the rest was a mere walk.

A few days later Tyndall tackled the same peak alone, and in his shirt sleeves, armed with a bottle of cold tea and a ham sandwich. He had a guide for some way on the glacier; but the man was afraid of the crevasses, and evidently thinking his patron mad, was glad to return when Tyndall paid him off and dismissed him. On this occasion the day was beautiful, and the way up perfectly clear; moreover, he had the advantage of following the track of a large party which had started several hours earlier, led by his former guide Lauener. But even under these circumstances, to climb a great peak alone is a matter of grave risk, and it generally verges upon the foolhardy. Tyndall realized this perfectly—few men were ever more guided by reason than he; but he also felt the spirit of adventure which impels one to mount alone among the gods, solely dependent upon one's own steady head and sure feet. The greater watchfulness which is so necessary lest one be trapped by fog and lose the way, and the need for carefully testing every step

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on an awkward slope, were meat and drink to him; the moaning wind blew any fugitive sluggishness out of his mind. "The thought of peril," he wrote afterwards, "keeps the mind awake."

You may have noticed the beautiful rainbow effect of light shining upon a soap bubble. The shades are called "interference colours"; a splendid display of them was seen by Tyndall during this ascent. "A light veil of clouds had drawn itself between me and the sun, and this was flooded with the most brilliant dyes. Orange, red, green, blue, all were exhibited in the utmost splendour." The contemplation of colour was soon followed by a study in sound; for an avalanche on the neighbouring Lyskamm crashed down to the valley, sending up white clouds of snow dust. A few days before, he had heard another when descending with Lauener; but in the fog it was invisible, and it then seemed a weird and awful noise.

At the bottom of the Comb he paused a moment. "I felt just sufficiently afraid to render me careful." He then attacked it quietly, and conquered the worst piece of the ascent. A momentary fit of giddiness was overcome by the application of cold tea and two mouthfuls of sandwich; and he then encountered the other party, just returning from the top. He

pressed on past them, and at length the cherished view was his. It was the first time that a man had ever stood alone on so high a summit, a solemn moment even though the danger be not as great as it appears. One's feelings are wrought to a high pitch by the mere consciousness of being alone, cut off from the world below by barriers of rock, ice, and fog; mingled with the sense of conquest is that of danger, while doubts as to the possibility of tumbling during the descent are apt to intrude themselves upon one. At this instant an accident happened which stirred Tyndall into action; his axe slipped and fell some thirty feet away. "The thought of losing it made my flesh creep, for without it the descent would be utterly impossible."

He regained it notwithstanding, and commenced the descent; racing after the distant specks which announced the other party's progress. The rocks, at least, were solid and safe; but at the Comb, which was neither solid nor safe, he stopped, drove his axe up to the head in the snow, and ventured step by step to cross that dangerous overhang. One place there was where the snow on which he stood seemed glued to the *side* of the cliff; for the bare ice rose beside him, and between it and the snow shelf a gutter ran. He followed

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the groove until the cornice became unsafe, and then attacked the ice, cutting steps in it with great care, and moving only one foot at a time; giddiness or a slip at this point would have been disastrous. At last he got off the dangerous edge, and hurrying down, overtook the slow-moving party, with whom he finished the descent.

They had just had an exciting experience. One of them, whose knee was injured, had slipped upon the icy ridge of the Comb, and Lauener, to whom he was roped, was drawn after him. It was as if one had become giddy whilst sitting astride a house roof, with a drop six times the height of Big Ben on either side. Both men fell towards the more precipitous face, where they must inevitably have perished.

“There was no escape there,” said Lauener, subsequently, “but I saw a possible rescue at the other side, so I sprang to the right, forcibly swinging my companion round; but in so doing the baton tripped me up; we both fell, and rolled rapidly over each other down the incline. I knew that some precipices were in advance of us, over which we should have gone, so, releasing myself from my companion, I threw myself in front of him, stopped myself with my axe, and thus placed a barrier before him.”

We can now see why he had not securely roped himself to Tyndall on the previous ascent. He believed that in an emergency he should be free to act as circumstances dictated; but he was just as ready to sacrifice his life as any other of the brave body of men to whom he belonged.

CHAPTER II

The Conquest of the Matterhorn

Twelve miles west of Monte Rosa there rises from the frontier a huge pillar of rock, gaunt, largely bereft of snow or ice, and standing out from all its neighbours like the menacing crooked finger of a giant; this is the Matterhorn, one of the most famous peaks in the world. Glaciers flank it on every side. Its grim, precipitous faces, its steep ridges, overhanging cliffs and tragic history lend it a peculiar interest. It seems expressly to defy any man to set foot upon its crest.

Two principal valleys lead away from the Matterhorn. On the north-east the Z'mutt Glacier runs down to the valley of the same name, with the guide-crowded town of Zermatt below. On the south the Val Tournanche holds the brawling Matmoire torrent; and here, some 8000 feet below the peak, is the little village of Breuil, a convenient spot from which to study our mountain. The Matterhorn resembles a great pyramidal tower, with sharp angles and

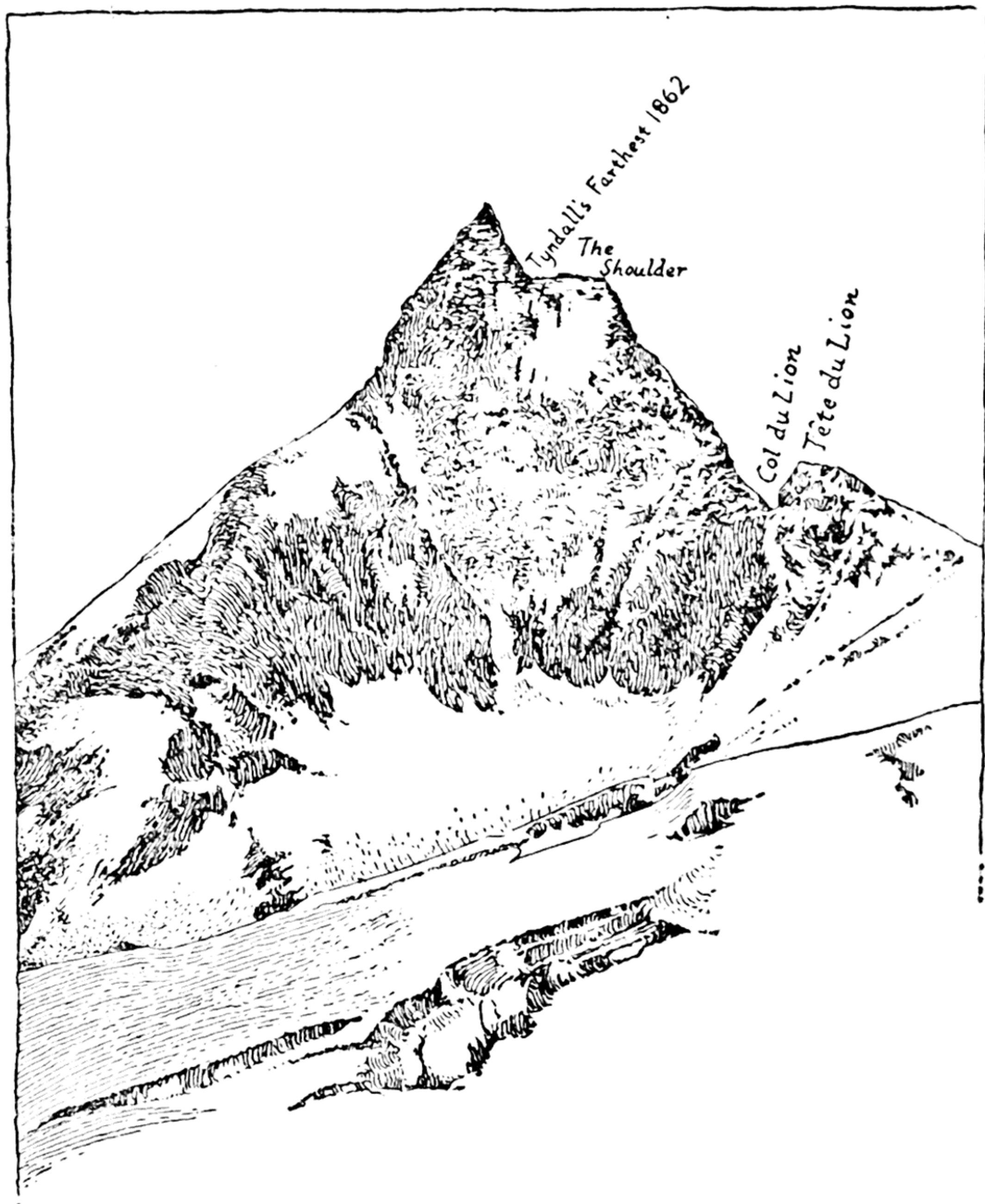
faces that sometimes bulge outwards, so steep are they. On the side remote from Breuil the tower is crowned by a minor pyramid 800 feet high; at the base of this the main tower has been cut away in a nearly horizontal ridge, the Shoulder, which runs to a bold down-sweeping curve towards the valley. The lower part of the curve is broken by a conspicuous notch or gap, the Col du Lion; on the far side the continuation of the curve forms a bold knob called the Tête du Lion. From the foot of the gap a glacier runs down towards the torrent. Thus the general aspect of the Matterhorn remarkably simulates that of Mount Everest, except that its sides are much steeper and its height much less.

De Saussure was the first climber to display much interest in the Matterhorn. He saw it at close quarters two years after his success on Mont Blanc, but he dismissed it with a glance as being manifestly unassailable. Nevertheless he went there again in 1792, staying in a house at Breuil, and collecting rocks and plants in the vicinity. Of course he made no attempt to scale the grim brown walls.

As years rolled on, peak after peak succumbed to the ardour and skill of guides and amateurs, but the Matterhorn remained unsullied. The guides, in fact, were afraid of it, almost to a man. It struck them as uncanny. They would

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climb anywhere, as one of them told Whymper, but they would not waste time on the impos-



The Matterhorn from the North

sible. An ascent without guides at that date would have been foredoomed to failure, while

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with guides in such a mood as this the odds against success were doubled.

One man alone believed that the Matterhorn might be conquered; a curious character he, strong of wrist and sure of foot, and a native of Val Tournanche, whence most of the attempts were subsequently made. Jean Antoine Carrel was his name. He had fought at Solferino against the Austrians, and was known far and wide as the "Bersagliere"; a bold independent hunter of mountain-tops, he sometimes found difficulty in submitting his proud spirit to the dictates of those who employed him. He was reticent, as a rule, but could be induced to thaw by the application of what Whymper called his sovereign remedy for all ills, a bottle of good red wine. Carrel, whose name will often appear in the following pages, believed that the Matterhorn was practicable, if at all, from his native glen, and all his efforts were made on the Breuil side.

In the summer of 1858 this remarkable man impressed his strong will upon his brothers and some other guides, to such purpose that they overcame their dread of the peak sufficiently to try an ascent; but the Matterhorn was not one of those monsters which can be overcome at the first onslaught, or even at the second. They found a way up the rocky side of

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the Glacier du Lion to the pass which, you will remember, separates the great buttress of the Matterhorn from the Tête du Lion; and they even climbed the buttress for some distance, but the difficulties thickened, and at a smooth and awkward point they returned.

In August, 1860, when Carrel was about thirty-two years old, Mr. Vaughan Hawkins found himself at Breuil, and he invited the redoubtable Professor Tyndall to join him in an attack on the Matterhorn. Tyndall was nothing loth. They had in J. J. Bennen a resolute and promising guide, besides one of the Carrel family.

The way up to the Col du Lion was masked with soft snow, but after some difficulty there they got up to it, 11,804 feet above the sea. It is from this point that the ascent of the Matterhorn really begins. A col is not a pass in the true sense, i.e. a road where people other than mountaineers can cross, but simply a gap in a ridge between two mountains. Thus the Col du Lion breaks the ridge between the Matterhorn and the much smaller Tête du Lion; the descent on the far side is a dangerous precipice, scored by countless volleys of stones from the mountain, terminating in a glacier, and only ascended twice in the thirty years following these events.

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The wall of the Matterhorn rises from the Col du Lion in an extremely sharp cliff, and a short way up is a spot where a gully runs, smooth and frequented by falling rocks, for some way upwards; there is practically no hand- or foot-hold, but it can just be scaled with extreme difficulty. This was the obstacle which had stopped the Carrels on their first attempt; but the present party got over it. It afterwards became famous as *The Chimney*; there are many such on mountains, but this particular one is *the Chimney*. Time was now running away fast; and although Hawkins and Tyndall got several hundred feet higher, the difficulties above them seemed insurmountable. To be caught by darkness on the face of a precipice, without any protection whatever, was not to be thought of; and they retreated. Their highest point, 12,992 feet, was almost 2000 feet below the summit.

This concluded the serious work for that year.

There now comes upon the scene another formidable character, as resolute as Tyndall, as obstinate as Carrel and as skilled as either. His friendly rivalry with the London Professor during the long siege of the Matterhorn, with its terrible climax, forms one of the most interesting chapters in mountaineering history.

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Edward Whymper was a young artist, and the son of a London wood engraver, to whose business he succeeded. In 1860, when only twenty years of age, he was sent to the Alps to make sketches of mountain scenery, and in that capacity he accompanied the geologist, Professor Bonney, who tried to scale the virgin Mont Pelvoux but failed. This first taste of defeat on a mountain filled Whymper with an ineradicable love of climbing; and the worse the prospects the more determined he was to overcome them. Strong-willed and imperious, he was as unyielding as the granite rocks themselves; and it was largely his influence and example which popularized a very difficult art. In the next year (1861) he went back to Mont Pelvoux and did not rest until he had planted his staff on its crest. We find him later, writing in the visitors' book of the Monte Rosa Hotel (27th August), "Edward Whymper, en route for the Matterhorn." Underneath this entry some opponent subsequently added another: "This gentleman is always attempting the impossible, and then he curses everybody because he fails in his attempts." Be that as it may, the 28th August discovered him at Breuil.

Whymper concluded from the first that the peak could not be climbed in a single day. Somewhere up there among its brown preci-



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EDWARD WHYMPER IN THE ALPS

*Reproduced from an engraving of a drawing made by the mountaineer
By kind permission of Miss Ethel R. Whympér*

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pices a ledge must be found on which a tent could be placed; and if a night were spent there a whole day would be available for dealing with the host of dangers above. The guides were lukewarm, not to say afraid, while J. A. Carrel could not accompany him; but he engaged another guide for a reconnaissance, and after spending the night in an elevated spot where a cowshed stood, started early next morning for the Col du Lion. They kept close to the rocks under the Tête du Lion, ascending by a sort of natural stairway; and by 10.30 a.m. they stood in that cold and intensely windy gap, with a steep snowy slope down to the Lion Glacier on one side and the sheer precipice above-mentioned on the other. The Col was wide enough to take a tent, however, so they returned to the cowshed and carried one up, determined to spend the night there.

They pitched the tent under an overhanging cliff, but the wind was so violent that it pulled up the pegs, and in order to prevent the whole thing from blowing away they had to make a sheet of it and wrap themselves in it. While thus uncomfortably trying to sleep, crash after crash announced a fall of rocks. The guide was mortally afraid, but the overhanging ledge proved ample safeguard.

Before dawn they rose, and as soon as it was

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light they left the narrow wall and began to climb the ridge. After an hour of what Whymper called "downright climbing" they reached the Chimney, where a smooth rock overhangs. By a few gymnastic efforts the amateur got over it, but the professional failed; the danger of the thing, coupled with his last night's experience, decided him to go no farther; and after a sharp argument, Whymper, who was so awkwardly placed that he could not even get down again without the guide's help, capitulated, and they returned to Breuil. So ended the first of his eight attempts on the Matterhorn.

During the middle of the succeeding winter Mr. T. S. Kennedy tried to rush the peak from the opposite side; but the bitter winds proved too deadly, and the effort failed below 11,000 feet—much less than the height of the Col du Lion.

July, 1862, saw Whymper back again, accompanied this time by his friend R. Macdonald and two expert guides, J. Taugwalder and J. Kronig of Zermatt; this displayed bad tactics, for the Carrel party, who knew most about the mountain, and who of course were Italians, would have nothing to do with their Swiss rivals. Whymper also engaged a singular character in Luc Meynet, a hunchback porter,

whose faith in his master soon became unbounded, and who carried the tent. Meynet, in fact, proved a pluckier man and better companion than many guides. As to the tent, it was of Whymper's own design; being triangular in cross-section, with the canvas firmly sewn to the uprights, and capable of holding four men. Meynet manœuvred it up and down the Matterhorn precipices, although it weighed more than 20 lb.

On 7th July they started to follow what Whymper believed was his original route; but instead he landed the party on top of a cliff of the Tête du Lion, overlooking the Col. While trying to get down again, "Kronig slipped on a streak of ice, and went down at a fearful pace". Happily, by keeping on his feet, he was able to recover himself just in time. The Col was so narrow that they had to build a platform on it before they could erect the six-foot tent; and then, as soon as they were snugly inside, the howling wind developed into a gale. It always blows severely at such points as this, and, so long as the guy-ropes hold, little harm is done; but when, as in this case, the wind continues to batter and shriek long after daylight, making it a misery to stand up in it, matters are apt to take on a worse complexion. After a wait of several hours a temporary lull

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enabled the climbers to get out of the Col; but they had only risen about 100 feet when they were compelled to stop, hanging on for dear life to the cliffs, while "stones as big as a man's fist were blown away horizontally into space". At the first opportunity they crawled back to the Pass once more, and the climb was abandoned.

Two days later they made a fresh start, the guides this time being the Bersagliere and Pession. This was Carrel's first experience of the man with whom he was to serve so often, and it was not a happy one. They rose without difficulty above the Col and to the foot of the Chimney; and there, on a flattening of the slope, they built out a little platform, upon which the tent was pitched; this eyrie stood 12,550 feet above the sea, with a smooth cliff above and a sheer drop for some thousands of feet below. Another hour's climb carried them over the Chimney and past Hawkins' farthest; as the prospects were so promising, they then returned to the tent and spent the night there.

The following day broke fine, but now it was man who failed Whymper, instead of the weather. The leader, Macdonald, and Carrel successfully negotiated the awkward Chimney; but although Pession just managed to imitate them the effort destroyed his nerve, and he refused

to go on. Carrel would not ascend without him; the others were helpless without Carrel; and so they all returned once more to Breuil, leaving the tent on the ledge.

As our artist climber had not been very successful with guides, he now tried a reconnaissance of the peak without them; for after the last failure he could find nobody willing to go, except little Meynet. He knew full well the difficulty and danger of such a thing as wandering about those awful precipices alone; but he had invented two simple devices which he always regarded as an extra pair of hands. One was a grappling-iron, which he could hook on to a convenient rock, swinging it up if necessary, and thus raise or lower himself over out-bulging places. The other was an iron ring, with which he formed a running noose in the rope. This ring had a cord attached to it; and when, as often happened, he was forced to loop the rope round a rock, and then descend with its aid, by pulling the cord he could release the noose, a thing otherwise not always practicable.

On 18th July he climbed alone up to the tent, and, the day being fine, sat in the sun, with the glaciers far beneath his feet, in enjoyable if somewhat giddy idleness. "The little birds which had built their nests on the neighbour-

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ing cliffs," he says, "had begun to chant their evening hymn before I thought of returning." He therefore determined to spend the night there, quite indifferent to the idea of sleeping on the edge of a precipice several thousand feet deep, with the ever-present possibility of rocks from above crashing upon him through the canvas.

In the morning he decided to explore the higher regions. The face above the Chimney was smooth and bare, with virtually no hand-holds; and he was forced across the ridge to a patch of snow, which enabled him to climb above the difficult part; then the ridge could be followed again until a huge gendarme,¹ known as the Great Tower, barred all further progress. There was space for a tent at its foot, but a little farther on the ridge ceased to afford anything by which one could hang on. Here he had to spring up over a bulging rock, and haul himself up by his hands, only to encounter worse obstacles.

"Progression directly upwards was then impossible. Enormous and appalling precipices plunged down to the Tiefenmatten Glacier on the left, but round to the right-hand side it was

¹ The ridges by which mountaineers commonly ascend peaks, and which are known as *arêtes*, have very irregular slopes, often broken by great tower-like buttresses; such obstacles are called *gendarmes*. See also Glossary, p. 224.

just possible to go. . . . I have a vivid recollection of a gulf of more than usual perplexity, with minute ledges and steep walls; of the ledges dwindling down and at last ceasing; and of finding myself with arms and legs divergent, fixed as if crucified, pressing against the rock and feeling each rise and fall of my chest as I breathed; of screwing my head round to look for hold and not seeing any, and of jumping sideways on to the other side."

It was useless, however, for the decayed and quivering rocks beyond the Tower were slipping under him; the cliffs grew worse than ever; and he turned back, having reached about 13,400 feet.

The Matterhorn was not the sort of antagonist to let him get away too easily. He arrived at the tent, where he left his axe, which had caught in the rocks as he came down. He also descended the Chimney in safety, by means of his iron claw and rope, crossed the Col du Lion, and was within fifty yards of the natural staircase that led down to Breuil, when he came to an icy corner. Here six steps had to be cut, some being on the far side. He now felt the want of his axe, but did the next best thing by prodding at the snow with his stick, until two good steps had been made. The rest had better be told in his own words.

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“In attempting to pass the corner I slipped and fell,” down a slope of 45 degrees, which overlooked the Glacier du Lion 1000 feet below. He fell head first in a series of great bounds, “striking my head four or five times, each time with increased force. The last bound sent me spinning through the air in a leap of fifty or sixty feet from one side of the gully to the other, and I struck the rocks, luckily with the whole of my left side. They caught my clothes for a moment, and I fell back on to the snow with motion arrested. . . . A few frantic catches brought me to a halt. . . . Ten feet more would have taken me in one gigantic leap of 800 feet on to the glacier below.”

His head was bleeding badly, but he stopped it by making a plaster of snow, scrambled up again, and then fainted away. It was sunset before he recovered consciousness. He then descended the remaining 4800 feet to Breuil without further accident.

Despite this happening, Whymper was more determined than ever to master the peak. After recovering from his injuries he started yet again (23rd July), with J. A. Carrel and another guide, as well as the hunchback Meynet. They slept at the tent, and on the 24th got up as far as the ridge behind the Great Tower, where Whymper had been stopped. Suddenly

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the sky began to darken, and they were soon enveloped in a blinding snowstorm. At this place, where the feet sank deeply among the frost-rotted stones, with an awful precipice on both sides, to continue climbing during the storm, or even to move, was impossible. They stopped there for hours, and eventually succeeded in crawling back, first to the tent and then to the valley below. Twenty-eight years later just such another blizzard caused the death of the aging Carrel from exhaustion on this very mountain.

Although a failure, this attempt enabled the assailants to gain one more bastion; for they built a platform under the Great Tower, 12,992 feet above the sea, thus enabling the tent to be moved up nearly 500 feet.

For the fifth time Whymper attacked the peak next day, accompanied only by Meynet, whose deformity proved rather an advantage among the misshapen crags of the Matterhorn. They slept at the tent as before, subsequently passing their former highest. "Little by little we fought our way up; but at length we were both spreadeagled on the all but perpendicular face, unable to advance, and barely able to descend." Once again the Matterhorn remained unconquered.

During this season Whymper decided to

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make still another effort, by somehow taking up a ladder to the point at which he had just been defeated. His plans were frustrated by the arrival of Professor Tyndall and a friend, who had already engaged both the Carrels as well as their old guide Bennen. Whymper chivalrously placed his tent at their disposal. While on the way up both men chanced to be upon the mountain at once. Tyndall, whose guide was leading, heard a loud report from above, followed by a warning cry. A great rock had broken loose; it fell for a long way sheer on to the cliff above him, and then shot off over his head. Whymper, who was far below, heard the shout and crouched for safety; the rock whizzed by, rattling and bumping on its way down to the glacier.

All the previous climbs from Breuil had had as their object to get to the top of the cliffy ridge which descends from the western front of the Matterhorn; once up there they would have a fairly flat ridge to follow, beyond which was the final 800 feet of the pyramid proper. Hitherto nobody had scaled this cliff; but Tyndall now succeeded, although brought up by what seemed impassable places more than once.

When they gained the ridge, they were disappointed to find it frightfully narrow and

dangerous, steep walls descending from both sides, while in front of them was a depression which it seemed no man might safely cross. He had difficulty in getting his guides to tackle this ridge at all, for with the exception of the brave Bennen they believed the attempt was suicidal. When at last, after crawling along the quaking knife-edge, this gulf met their gaze, with a sheer cliff beyond it as bad as anything that had yet been tackled, their hearts failed them, and they would not continue. Tyndall, who never admitted defeat, was for proceeding at all costs, but he wished to be guided by Bennen. Bennen would not take the responsibility; and eventually they turned back, making a perilous descent in the teeth of a hail-storm. The highest point attained, which looks from below like a lower summit of the Matterhorn, was 13,970 feet, and was afterwards named Pic Tyndall; it is 810 feet below the top.

In 1863 Whymper made his sixth attempt to climb the Matterhorn, and he had a terrifying experience. Once more he was accompanied by J. A. Carrel, besides Cæsar Carrel, two other guides, and the hunchback Meynet. They started on a glorious morning, 10th August, and by nine had reached the Col du Lion. Nature works great changes in such places as

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this even during one winter; for the icy fingers of frost force apart the rocks by opening every crack, and then, when a thaw comes, the whole mass tumbles in ruin to some lower point. The Col was a mere line now, treacherously slippery, and it could be traversed only by cutting steps; while the way up to it was even worse, for the glaze was hidden by a cover of loose snow, ready to slip at a touch. Almost at the point where Whymper had fallen, Jean Antoine Carrel, while swinging his axe, felt the snow go from beneath his foot; but such was his sangfroid that he jumped back instantly to a safe rock, and remarked, "It is time we were tied up."

As the steps were cut loose powdery snow drifted into them; so the leading man went as far forward as possible, the others then following one by one, held up by the rope. The cliffs above the Pass proved even worse than usual, for water had seeped over the faces of the rocks, and made them like glass. It was necessary here for all the party to remain in their places, only one moving at a time; when he slipped, the ready hands on the rope stopped him instantly. By this perilous mode of progress they surmounted the Chimney; then the weather suddenly broke, mists rolled down upon them, and a snowstorm made every foot-

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step more doubtful. Despite all this they reached the platform that had been built under the Great Tower, set up the tent there, and took shelter within it.

The wind, acting as if it possessed sense and was angered by this defiance, hurled upon them gust after gust, trying in vain to blow the tent away; meanwhile a fierce thunderstorm added to the tumult, lightning stabbed into the unnatural gloom, and the simultaneous crash of the thunder showed how close it was. There was none of the ordinary rolling noise of thunder, which is due to echoes, but only one sharp crack after each discharge. Whymper has left us a vivid drawing of this awe-inspiring scene: the little tent perched like a white dot beneath the dark cliff of the Great Tower, on the very edge of a precipice that descends until it is lost in clouds, while the surrounding crags are half illuminated by the gleam of the lightning.

But the invaders were not to be intimidated. The spirits of the Matterhorn might spit and stab their hardest, but there the six men were, and there they determined to stay. During the afternoon the storm wore itself out, and the porter was sent down to Breuil again; the rest determined to spend the night in their eyrie, hoping for final success on the morrow. What a night it was! The wind howled and moaned

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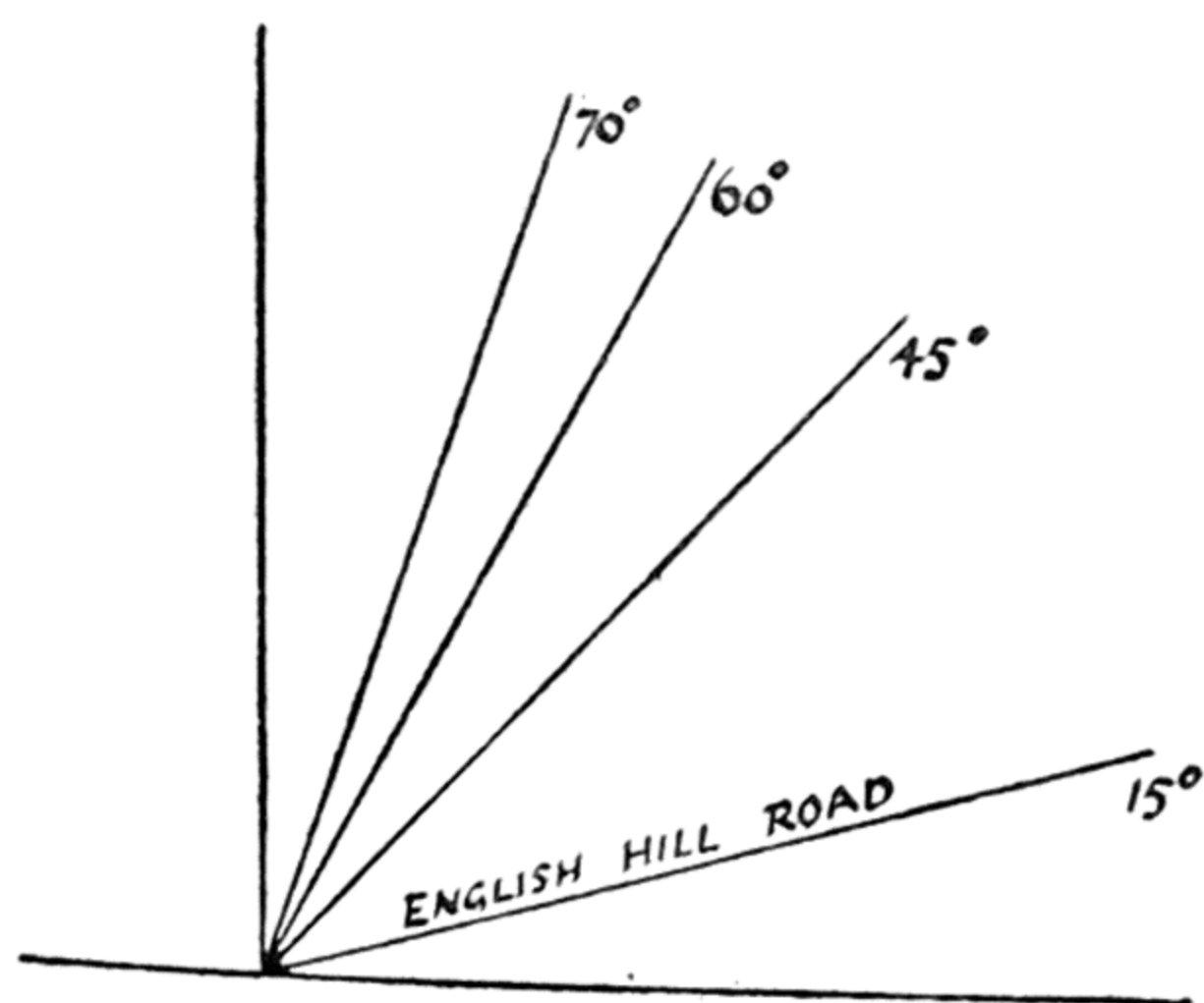
as it furiously sought to wrest the little tent from its moorings; thunder cracked at them; rocks from above went hurtling past their door. At 3.30 a.m., storm or no storm, they got ready to start; by nine o'clock the storm had gone, and the sun appeared. The climbing, however, proved as bad for them as it had been a year before for Tyndall; and to crown all, after spending two hours in climbing only 300 feet—little more than half the height of Beachy Head—it started to snow again. They had had enough of the Matterhorn by this time, and they decided unanimously to retreat. Imagine their surprise on reaching Breuil to learn that the weather there had been excellent, apart from a few clouds on the Matterhorn!

The succeeding year (1864) saw a pause in the attack. One of the chief assailants was otherwise engaged, having been smitten with a desire to understand the nature and causes of those deep gorges through which milk-white torrents churn a way. The other was sharpening his climbing irons and putting a fresh edge on his axe; in plain words, Whymper was qualifying himself for his next attempt (for his resolution to conquer the mountain never wavered) by all the most difficult climbs he could find.

The most exciting, perhaps, was the first

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ascent of the Pointe les Ecrins (The "Jewel Basket"), a neighbour of Mont Pelvoux, but considerably higher. It rises 500 to 700 feet above a snow plateau which can easily be attained; but the snow is bounded by an enormous *bergschrand*,¹ and if the climber succeeds in passing this chasm, he is everywhere faced



by an exceedingly steep slope of glassy ice, at an angle of more than 50 degrees. Set in the ice are crowds of small rocks, so loose that a touch sends them down on the heads of the men behind the leader. There are three faces to the mountain, the ridges which bound them meeting in a point so small that a man cannot get on it; the faces other than that by the great crevasse are precipitous in the extreme, and were not to be thought of.

¹ See the Glossary, p. 224.

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At this point we may digress to point out the great steepness of any slope exceeding 40 degrees; this will be seen from the accompanying diagram. An English hill road rarely has a grade of more than 1 in 4, or say 15 degrees.

This formidable peak had been attempted in 1862 by Professor Bonney (who, you will remember, had been the cause of Whymper's first visit to the Alps). He had the Brothers Croz as guides, of whom Michel was among the best and bravest of that community. They got across the crevasse, and Michel Croz went up to try to gain the ridge, a far more practicable line of approach than trying to balance oneself on the glassy face of the mountain. He had gone only a hundred yards when he got into difficulties, and called out to his brother, who started to cut steps up to him. Meanwhile Michel cut steps down; yet so perilous was this place that three-quarters of an hour elapsed before the two met!

In 1864 Whymper, who had also seen Les Ecrins from Pelvoux, determined to try it. He engaged Michel Croz, besides another very capable guide, Christian Almer; and on 25th June, 1864, a splendid day, they made the attempt.

Before arriving at the snowfield, which is



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(Chapter II)

Photo. B. Webster Smith

high up on the peak, and above which is the little pyramid just described, they had to climb a steep gully 1000 feet high, and even to cut steps in it; then from the edge of the snowfield they saw the gaping head-crevasse, a most dangerous obstacle. They stopped for a meal, were lucky enough to find a way across the chasm, and shortly after 8.0 a.m. were among the loose rocks above it.

They first tried to get up to the ridge, as Croz had done before, but half an hour's work made no impression on it; so they returned to the edge of the crevasse and proceeded to cut steps parallel with it, so as to bring them beneath the summit. Croz and Almer did the cutting in turn; meanwhile the others had to remain still where they stood, unable to move in any direction; for the slightest slip would have hurled the whole party down the chasm. In this way three hours elapsed, and still they were no nearer the summit.

They then turned about, went back to the rocks and made another effort to get up to the ridge, and at last they succeeded. Almer untied himself to go ahead, and when within a few feet of Whymper a small patch of snow beneath him gave way. He overbalanced, "but he happily fell on the right side and stopped himself. The alternative was to fall several

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hundred feet without touching anything, and then a fierce descent to the glacier 3000 feet below." Even although they were now firmly on the ridge, it was so slippery that it took another hour to get to the summit; and no sooner had they succeeded than all wondered how they were ever going to get back. To return in their tracks seemed madness.

"Our faces," wrote Whymper, "were a tolerable index to our thoughts, and apparently the thoughts of the party were not happy ones. . . . Had anyone then said to me, 'You are a great fool for coming here,' I should have answered with humility, 'It is too true.'"

They decided to descend by the opposite ridge, which, like the other, had a vertical precipice on their left, and a slope of more than 50 degrees on their right. They had got very cautiously down a part of the narrow knife-edge, when "a deep notch brought us to a halt. Almer, who was leading, advanced cautiously to the edge on hands and knees, and peered over." It was impossible to descend the wall of this gap, and the only course short of returning to the summit was for Almer to jump across to a delicately balanced slab. He took the risk and sprang; fortunately the rock held him. The others of course got across more easily. They still had to reckon with the

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great crevasse, however; but fortune now smiled upon them. They struck it at a place where its upper wall overhung the lower; thus a drop of ten feet into the snow below enabled them to clear it. They had been $8\frac{1}{2}$ hours in rising and descending a trifle of 525 feet, just a fraction more than the elevation of Peak Hill at Sidmouth!

On the 19th June, 1865, inspired by the confidence due to overcoming numerous difficult mountains, Whymper stood once more before the redoubtable Matterhorn; this time his base of operations was Zermatt, north-east of the peak. He had learned that the precipices there, which appear to overhang, do not really do so. Moreover, the peak is formed of great rock layers arranged like rude masonry, and the layers, which tilt down towards Breuil, tilt up towards Zermatt; thus each ledge, which slopes towards the valley on the Breuil side, slopes towards the sky on that of Zermatt, thereby affording perfect hand- and foot-hold.

Accompanied by the guides Croz, Almer, Biener, and the hunchback, Whymper made his seventh assault at 5.45 a.m. on 21st June; they carried three days' food. It was necessary to ascend a gully (a natural channel for falling rocks) before they could get on to the glacier which flanks the Zermatt face of the mountain.

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While in this gully they were suddenly startled and dispersed by a volley of stones which bounded madly from side to side in their descent of the chute. Soon afterwards the weather changed, snow began to fall, and the attack had to be abandoned ere it had properly commenced. After this Almer refused to have anything more to do with the Matterhorn.

Three weeks later came the last and most fateful attack of all. It was the 13th July, at 5.30 a.m., when four climbers left Zermatt, with two guides and two porters. Of the climbers, Whymper, Lord Francis Douglas, and the Rev. Charles Hudson were thorough experts; the fourth man, Mr. Hadow, was young and courageous, but had only had one season in the Alps. The guides, Michel Croz and Peter Taugwalder, were both highly reliable; two of Taugwalder's sons acted as porters.

By 11.30 a.m. they had surmounted the gully and crossed the glacier; they were surprised to find the lower part of the mountain "so easy that we could run about". Soon afterwards the tent was pitched at 11,000 feet, the intention being to spend the night there. Croz meanwhile went on to explore, and returned with the welcome intelligence that he saw no difficulties.

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On the 14th seven of them started directly it was light, one of the porters returning to Zermatt. Without much labour they rose some 3000 feet up the inwardly-inclined steps, and by ten o'clock were higher than Tyndall's best. The ridge above them was crumbling to pieces, but they kept well under it so as to minimize the risk of falling stones; meanwhile crossing with extreme care a horizontal distance of 400 feet, where the rocks, glazed with ice, were highly slippery. They then got up to the ridge, and only an easy climb over snow lay between them and the summit; and Croz and Whymper, breaking into a run, arrived there together. A flagstaff, made from a tent-pole with Croz's blouse for the fabric, was stuck upright, and the signal was immediately seen in the villages below. The five years' siege was over, and the Matterhorn climbed at last!

Meanwhile an Italian party, led by Jean Antoine Carrel, had also been attacking the peak, but from the Breuil side. Looking down, the conquerors discerned them, still 1200 feet below. They threw down stones to attract their attention; when the superstitious Italians, who believed that the demons of the Matterhorn had come to life, scrambled down again as fast as they could.

Now came the descent. Croz went first,

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Hadow second, Hudson next, Douglas fourth, then the elder Taugwalder, Whymper sixth, and young Peter Taugwalder in the rear. Before leaving the top Whymper had suggested that when they reached the slippery point a rope should be stretched out and fixed to the rocks for additional security, but during the descent the whole party forgot it.

On reaching the difficult part great care was taken. "Only one man moved at a time, and when he was firmly planted, the next, and so on." Nevertheless it was here that disaster swiftly overtook them. Croz and Hadow had rounded a corner, and were not within Whymper's view, when Whymper heard an exclamation from the guide. Apparently Hadow had slipped, and rolling over had knocked Croz off his feet. Instantly Whymper and the elder Taugwalder pulled the rope taut. The jerk carried away Hudson and Lord F. Douglas, and the sudden strain broke the rope between them and Taugwalder. The four leaders crashed down to their deaths, "tumbling from precipice to precipice down the face of the mountain, not to halt until they were on the Matterhorn Glacier 4000 feet below."

The three survivors were now in a dreadful plight. The Taugwalders, stricken stupid with panic, would neither move themselves nor

allow Whymper to act. After a long time the older guide recovered himself sufficiently to fix the rope to a rock, and tremblingly led the way down. Whymper then noticed with astonishment that the broken rope was a reserve one, never intended to take the strain to which it had been put. The nerve of the guides having gone, what might have been a relatively easy descent became a fearful trial. "For more than two hours afterwards," said Whymper, "I thought almost every moment that the next would be my last; for the Taugwalders were in such a state that a slip from them might have been expected at any moment." Eventually they got over this perilous place, and the descent became safer. They were still on the mountain, however, when sunset came. The setting orb now added to the sense of tragedy which pressed so heavily upon them, by casting a weird shadow upon the rising mists; it was a ring which enclosed two crosses and part of a third.

Two days later three of the bodies were recovered. "They had fallen as they had fallen above—Croz a little in advance, Hadow near him, and Hudson some distance behind; but of Lord F. Douglas we could not see anything. We left them where they fell, buried in snow, at the base of the grandest cliff of the most majestic mountain of the Alps."

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Little more remains to be told. Jean Antoine Carrel got to the summit a few days later, by the Breuil route; while three years afterwards Tyndall also reached the summit by the same route. As to the latter, he was at Gadmen, opposite Monte Rosa, when the news of the tragedy arrived. "Do you know Professor Tyndall, sir?" said a guide. "He is dead; killed on the Matterhorn!" "I then listened," says the Professor, "to a somewhat detailed account of my own destruction."

He formed the noble resolution of searching for the body of Douglas. His plan was to fix irons in the slope at the place where the slip occurred, using steel punches to drive them in. A rope would be affixed to these irons, and by hanging on to it he hoped to follow the course taken by the unfortunate men as they fell. This bold plan failed. The rope was duly brought to Zermatt, but three weeks of constant bad weather made further efforts useless.

CHAPTER III

Up and Down the Caucasus

Imagine a double wall of snowy peaks, extending from N.W. to S.E. for several hundred miles, and many of them higher than Mont Blanc, with great glaciers filling up the channel between them and flowing down the valleys at their sides. On the north they decline to a barren and dusty wilderness, which is separated from the Russian steppes by a line of lesser heights; on the south their outliers run down through the densest of forests, pine below birch and beech below pine, to a snowflecked outer range and the valleys of Georgia. On the west is the stormy Black Sea; on the east the tremendous gorges of Daghestan, so deep that often the sun never glances on their floors, carry on the high land to the edge of the hot, salt Caspian Sea. The barren north is the home of peaceful Tartar mountaineers, tall, red-headed, garbed in long black coats, sandals, baggy trousers, and sheepskin caps, and each with the inevitable dagger in his belt. The

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fertile south is the home of the footpad, the murderer and the cattle thief; every house a castle, every cartridge belt full of bullets, and every day likely to suddenly terminate some unfortunate individual's existence. Such is the Caucasus, or rather, such it was in the year 1868, when a Sussex law student of twenty-three, Douglas W. Freshfield by name, first glimpsed its snows.

At that time the Caucasus, although so near to western civilization, was almost unknown. The Russian control over it, especially on the southern side, was so loose that a provincial governor could be murdered with impunity; while ordinary travellers kept to the one great highway through the chain, thankful if they reached Tiflis or Vladikavkaz with their heads unbroken and their boxes intact.

This highway is the famous Dariel Gorge, formerly an atrocious "road" through the heart of the mountains, with the turbulent River Terek rushing away beside it; so bad was it at times that a Persian ambassador and his servants once tumbled off into the stream, some of them to stay there for ever. It is of interest to us, however, because it goes right past the base of a mighty rock, 12,500 feet higher, cut into precipices and capped with perennial snow—the twin-headed ancient volcano Kazbek.

Less famous than Ararat (which on favourable days may be seen far away to the south), Kazbek yet has such a grand aspect that it suggested to Greek travellers the home of one of the Gods; and here they fixed Prometheus, God of Fire, who was supposed to have been chained to the rock for defying Zeus, while a vulture gnawed at his vitals. Here likewise, in more prosaic days, Russian high officials, guided by army training and supported by Cossacks, had tried to get to the top, of course without success; and here finally, in the year of grace 1868, Mr. Douglas Freshfield, student of law, had come to show them how to do it. His party, though small, was composed of experienced climbers, i.e. Mr. Comyns Tucker and Mr. A. W. Moore, with François Devouassoud of Chamonix; in addition they had an interpreter called Paul.

First it was necessary to find out something about their surroundings. In the climbs with which we have been dealing hitherto the mountains were well known and all the routes round them frequently traversed; but the Caucasus was virgin territory. Freshfield therefore put into practice a principle which he invariably preached, and which accounted for many of his mountaineering successes; he ascended a neighbouring summit to more than 10,000 feet, whence the geography could be clearly viewed.

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The volcano had two summits, apparently of about the same height, and separated by a hollow or saddle 500 feet beneath them. From the gap snow and ice, marked by the shadows of crevasses, but otherwise apparently easy enough, led down across a glacier which streamed away beneath them. There were no obvious difficulties, except perhaps the risk of bitter winds or bad weather.

The climbers returned to the village of Kazbek. The governor had just arrived on a visit, and the Englishmen were invited to the festivities, hospitality being traditional among these people; nevertheless everybody thought them mad for coming so far to attempt what (to the local mind) was an impossibility. It was necessary to get up a tent and provisions to a high level, and the only people who could be found for this purpose were four porters, led by "three aged men all more or less lame or blind". During the revels the party witnessed a sword dance by mountaineers in chain armour.

On the following morning they followed the course of the torrent up through meadows and over grassy hills, festooned with white rhododendrons, patches of deep blue gentians, and many other beautiful flowers. Reaching their glacier, they climbed upon it, and ascended until, at 11,100 feet, a moss-grown hollow

offered an inviting site for the tent, and here camp was pitched.

On 1st July, at 2.45 a.m., stepping out of the tent into the darkness and bitter cold, Moore, Tucker, Freshfield, and Devouassoud started off alone up the glacier, bearing only one day's food; the mountaineers were to remain encamped until their return. At first everything went well; then they came to a patch of tumbled rocks and broken, reeling ice towers; but, roping together, a way was found through them, and by 6.30 a.m. they were 14,800 feet up, i.e. equal to the top of the Matterhorn.

Towards the head of the glacier there were many deep crevasses, and in particular one bounded its rim. Above was a very steep slope of blue ice, treacherously covered with soft snow; the position being not unlike that which Whymper had to face on Les Ecrins. Here, as usual at such points, extreme care was taken, steps being cut all the way. Tucker was leading man. While they stood there the rope became slack, and caught in a projection from the wall of the crevasse. "Having in vain tried to unhitch it, Tucker began to cut steps downwards towards the upper lip of the crevasse;" when he overbalanced and tumbled head first into the yawning cavity. Fortunately Freshfield and Moore were so placed that they could

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take the strain, and after some excitement the leader regained the perpendicular.

The slope, however, which led up to the gap still necessitated extreme caution. The weather was boisterous, and as soon as a step was cut floury snow drifted into it and made the foothold doubtful. "For *four hours*," says Freshfield, "we had to cling to the slippery surface with knees and hands as well as feet, and exposed to a furious wind which drifted showers of snow and ice into our faces."

In the end they won, for at 11 a.m. the gap was theirs. Their first thought was less of the summit than of the way down on the far side of the gap; the latter, to their relief, seemed easier than the face up which they had been forced to ascend.

Observing that the highest point was the eastern summit, they now attacked it and by noon were on the top. Clouds rolled in a billowy sea below; and out of them, like so many islands, projected a great number of peaks large and small, needles, pyramids, domes, towers, nearly all encased in ice. Here was a new world for the mountaineer, next-door to Europe and almost untouched. It was, moreover, a world in which the beauty of the setting surpassed that in the Alps; for the sombre pine forests of Switzerland here give place to magnificent

woods of beech, while the beauty and variety of the field flowers and the rhododendrons add a blaze of bright colours to the scene. The height of Kazbek was determined at 16,546 feet.

Returning to the gap, they commenced to cut steps down the northern wall. After a time they were able to take, first to easy snowfields, and then to a glacier which led north; then the glacier became crevassed; quaking towers or *séracs* rose from a chaos of fallen blocks; the daylight was failing, and the prospect looked far from rosy. They therefore ascended a snow-covered ridge which lay between their glacier and a deep gorge, and for some time made good progress, sliding down long stretches. At length, however, they ran into a dense fog; and becoming entangled in a streamway, soon found themselves in a "savage gorge, pressed in on all sides by huge walls of crag". The torrent boiled away in its bottom, and the only route—track or road of course there was none—lay where the tumbled fragments formed a ledge or a tiny patch of beach rose above the milky stream. At some places, where the gorge closed in, avalanches had fallen; underneath the tumbled snow the torrent churned its way, over the top the adventurers gingerly climbed. At last this gloomy place opened out into a green

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hillside, with cattle and an ancient herdsman; and here they got shelter from the rain beneath an overhanging cliff. Next day they returned to Kazbek, where they were fêted by the local officials; for as they returned down the Dariel Gorge there could be no doubt about the ascent, even in the minds of those incredulous folk.

It was now determined to make a reconnaissance of the entire chain as far west as Mount Elbruz, 120 miles distant, and then to ascend the latter. Elbruz resembles Kazbek in standing out like a sentinel north of the main range; but by proceeding along the north side of the Caucasus for four days and then crossing the Mamisson Pass to the south, they managed to see far more of the peaks and hitherto unsuspected glaciers than would otherwise have been possible. This route, however, led our travellers into dangers of which they had never dreamed.

To carry their effects over the water-parting they had engaged ten carriers at a village called Res; on reaching Zacca, south of the range, these men were paid off. They then demanded more money. Freshfield tells the rest of the story very graphically.

“We had sought refuge from a noisy and intrusive crowd of villagers, in a house close

by. . . . At first we took no heed to the everyday sound of angry voices; but the row becoming serious, my friends sallied forth and found the Res men hustling Paul (the interpreter), who, spluttering with rage, was laying about him with a stout stick, while the people looked on and laughed. One of the Res scoundrels now seized Paul's sheepskin cloak, and they all hastily retired, carrying it with them. At this point of the proceedings I came upon the scene—saw Paul frantically excited, and our late porters, in a knot fifty yards off, with our cloak in their possession. Ignorant of what had passed, and fancying that a prompt move would settle the question, I ran up to the men of Res, took hold of the cloak, and motioned to them to drop it. Far from this, they began to pommel me after a fashion—fortunately a very harmless one, consisting of roundabout windmill pats on the top of the head. This may be a very effectual way of bonneting an adversary who wears a tall sheepskin; but it is singularly harmless to a man with a hard wideawake. In self-defence I quickly dropped the cloak. In a few seconds my friends came to the rescue—one hitting straight into the eyes of the thieves, the other charging them with his ice-axe. After some dozen blows had been given, the foe suddenly

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fled, carrying off the cloak with them, but leaving us in possession of the field of battle, and did not stop until they had put the river between us. Our next move was to turn to the chief of the village. Asked how it was that he stood by and allowed strangers to be robbed, his own people aiding and abetting the thieves, the only reply of this noble mountaineer was, that he would get back the cloak if we would pay him for it!"

The travellers were now south of the main chain, but in order to travel from east to west it was necessary to cross a succession of high passes, which either led over spurs from the range or through gorges that the headwaters of the rivers had cut in such spurs. The country now became densely wooded, thickets of birch rising above the serried rows of pines and the more noble but equally close array of beech trees; progress was rendered doubly difficult by a tangled undergrowth of wild roses, honeysuckle, and similar bushes. The principal stream, the Rion, is a river famed in antiquity, but age has not made its inhabitants anything but primitive peasants. They learned with amazement of the existence of pocket-handkerchiefs. "It is a difficult thing to blow one's nose in a duly solemn manner before 150 people, but we had frequently to do it."

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Hereabouts they made a short journey to the north, breaching the great wall of the mountains, and gleaning some idea of the peaks and their glaciers, but without attempting any ascents. They then reverted to their easterly march, through lonely woods where the damp moss squelched beneath their feet, across meadows so rich in huge grasses and weedy flowers that each man was all but lost to his neighbours, and over atrocious paths, without meeting a soul for three days. At last, in the valley of the upper Ingur, they saw ahead the coarse stone houses of a little town, Jibiani, and hurried forward with pleasure; feeling that the rude mountaineers, whoever they might be, must be an improvement on the silence of the woods.

They were soon rudely undeceived, Jibiani being an outpost of the worst communities in the Caucasus, and a hotbed of cattle stealers, freebooters, and murderers. Every house, with its severe slate walls, flat roof, and tall rectangular tower, was its owner's fortress. Light crept into the one dirty ground-floor chamber through slits near the ceiling or the hole in the roof; the walls were black with the smoke from countless kindlings of torches. The tower was subdivided into chambers above one another, and the way up from floor to floor was by a

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ladder that never reached the ceiling, so that only one man at a time could possibly ascend. Vendettas were common, and many inhabitants of such villages were reputed to be deeply dyed in murder. Surplus children were put to death. It was an adventure of the first rank to walk along the dark, unlighted, unpaved lanes at night. The arrival of foreigners in such a place sank all local hatreds in one common desire to rob the traveller of whatever might safely be carried off without too much risk to the persons of the thieves.

Accordingly, Freshfield's little party was greeted at Jibiani much as is a choice piece of meat when it falls among flies. A horde of savages, permeated by the peculiar musty odour of unwashed bodies and greasy clothes, surrounded them immediately, but they took refuge in a barn. A horse was procured, but the carriers whom they had expected to find here were not to be obtained on anything like reasonable terms. They therefore decided to load the horse, and (each man carrying his own saddlebag) to dispense with carriers altogether.

As soon as this became clear to the inhabitants an angry riot burst forth; the prize, which Heaven had so recently sent them, was to slip out of their hands untouched! They crowded round the door of the barn, and when

the Englishmen sallied forth, Devouassoud and Paul, who had hung behind, were pushed back by the throng, and the door shut upon them again. Freshfield rushed at once to the rescue.

"A blow from my ice-axe quickly sent the door in; a ruffian then put himself in the way, but the application of a revolver barrel to his face made him retire hastily. Forming a kind of hollow square, the horse in the middle, with our hands on our revolvers, we now marched out of the village by a sunk lane, where the inhabitants, yelling and jabbering, jumped down in front to bar our way, while others brandished weapons on either wall. A concession of some copecks to one rascal caused a scramble and diversion, during which we got away."

Eventually they secured carriers at a more friendly hamlet; and after wandering among the peaks, with the singular accompaniment of icy glaciers near by and magnificent vegetation bordering the track, they eventually came within territory policed by Cossacks, and were free from further efforts at intimidation. It is interesting to note that when Freshfield went back there, nearly twenty years afterwards, everything was much changed. The Russians had established village schools, at which the mountaineers' children were compelled to attend;

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priests had sown doubts in their minds as to the validity of tree worship, always the first step to civilization; and travellers had little to fear except from the natural results of curiosity. Seen under such circumstances, the stone villages, with their neatly kept barley fields and wattle fences (at which the women laboured all day while the men sat and smoked) were decidedly picturesque. But the yoke, though firm, could not prevail over the wild sense of freedom; and when the Great War brought red ruin to Russia, these people seized the opportunity to revolt. Unhappily, they exchanged a strong master for a tyrant, for the Soviet Republics controlled them with a hand of iron. One result of this is that recent mountaineering history is a blank, so far as the Caucasus is concerned.

To return to Freshfield's little expedition in 1868; they crossed the range to its northern side once more, and by 29th July had established themselves high up on the slope of Mount Elbruz, underneath the end of a glacier.

Elbruz (which, like Kazbek, is an ancient volcano) is by far the highest mountain near Europe. Its great dome rises above the steppe to a height of 18,471 feet, and it can be seen from steamers far out on the Black Sea. As a climbing feat its ascent offers no difficulty;

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but the bitter winds and, to a lesser extent, the altitude are obstacles which only determined men can overcome. Up to that time it had never been ascended.

On the next day (30th July) they carried up the tent over the chaos of rough lava boulders, and built a platform for it at 11,900 feet, and there they spent a cold and comfortless night, with the wind howling outside and the water freezing within.

It was still moonlight when they started off on 1st August, at 2.30 a.m.—what an hour to face an icy blast on an unknown mountain-side! “Presently,” the leader tell us, “I diversified the proceedings by entirely disappearing in a concealed crevasse; as we were roped, the incident was only an amusing one, but considerable hauling was necessary before I could get out, for the crevasse was large, and the snow-crust on the side of the hole I had made broke away when I tried to raise myself on it.” Meanwhile of course the strands of the rope were wearing away; nevertheless he did get out in the end.

Shortly afterwards one of their servants abandoned them. It was bitterly cold, and the more they rose the more they felt the cutting edge of the wind. At 16,000 feet, when much of the climb still lay before them, they stopped

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and hesitated, but the sight of their other servants coming up after them gave the necessary inspiration, and they went on again. At one place they had to cut steps up an icy gully; it brought them to what appeared to be the skyline, only to show an equally long slope ahead. They now came within reach of the full force of the wind; but the prize was too near to be lost without a fight. The way was easy, and "with their hands in their pockets and their ice-axes under their arms" they tramped on to the summit, fortunately escaping frost-bite. It was too cold to stay there more than twenty minutes, but they built a cairn, and then descended by the way they had come. The top proved to be a horseshoe-shaped ridge, part of the old crater rim. The view to the north showed nothing but clouds, but on the west they could see the Black Sea, and on the east lay the same beautiful chain of peaks which they had so recently seen from its other end, Kazbek. The journey down was uneventful.

How do we measure the heights of mountains? There is only one way which is at all exact, but there are several approximate ones. All important railways have their levels above the sea carefully measured from point to point; and if our peak be within easy reach of such a

line, then by taking its angle from two positions on the line we can determine its distance, and by taking the vertical angle which its summit makes we can determine its height. This is the most exact method known; but even this is not always true, because there is a property of light called refraction, which sometimes makes mountains appear of a very different height from what they are in reality. If the angle of depression from the top to a known point below can also be taken, a very valuable check on the result is obtained.

Railways, however, do not as a rule run close to important mountains, and in such cases the height of a mountain can be determined only by the use of instruments on its summits. These comprise mountain barometers and thermometers. A *mercurial* barometer is constructed on the principle that a column of mercury 1 inch square and 30 inches high will just balance the atmosphere at sea-level, if the temperature is unchanged; and the much smaller quantity of mercury in the instrument is proportional, so that its height reads 30 inches on a scale. The air becomes much rarer as one ascends, and this loss of weight is recorded faithfully by the mercury, which loses an inch of its scale for a height of 900 feet. Mercurial barometers are very accurate, but they are exceedingly liable

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to damage, and must be carried with more care than can often be employed in dangerous ascents.

The alternative mountain barometer is called an *aneroid*. It comprises a thin metal vessel, partly deprived of its air, which is so constructed as to show very slight changes in the pressure of the air without. It is much more convenient than the mercurial barometer, because it can be carried in the pocket; but it is far more liable to error.

Both types of barometer require their records to be adjusted or corrected, as it is called, for differences of temperature and other factors. When on a mountain, therefore, the observer has an associate either at a sea-level station or an inland station where observations are regularly made, and the position of which is known; thus he is able to synchronize his readings fairly closely with those below.

The third approximate method of determining mountain heights is by boiling water. The phenomenon of water boiling is connected with the pressure of the air; thus water, which boils at 212 degrees F. at sea-level, needs less and less heat as one climbs, the loss of heat being 1 degree for every 590 feet of height. Tyndall boiled water on the top of Mont Blanc at 184.95 degrees; on the Finsteraarhorn, which

is lower, the heat required was more, viz. 187 degrees.

We can now return to our climbers in the Caucasus.

From time to time after Freshfield had thus been the means of opening up this beautiful region, Europeans (and especially Englishmen) made travels and ascents there. Freshfield himself went back in 1887, when he conquered one of the noblest peaks, Tetnuld, a snowy pyramid 300 feet higher than Mont Blanc, and formed of three converging ridges. At one place on the ascent, where steps had to be cut in the wall of ice, one could see the sledge path of a pass between one's boots, and 7000 feet below. The other Europeans who visited the Caucasus, notably between 1886 and 1890, had nearly all had a sound training in the Alps, and many of them were accompanied by Swiss guides. They included Clinton Dent, then President of the Alpine Club, W. F. Donkin, Henry Fox, Hermann Woolley, and A. F. Mummery.

Of this adventurous band Mummery was perhaps the boldest. He had ascended the Matterhorn no fewer than seven times, two of the climbs being by particularly dangerous routes. He climbed over the Col du Lion by the almost perpendicular ice-slope which we have

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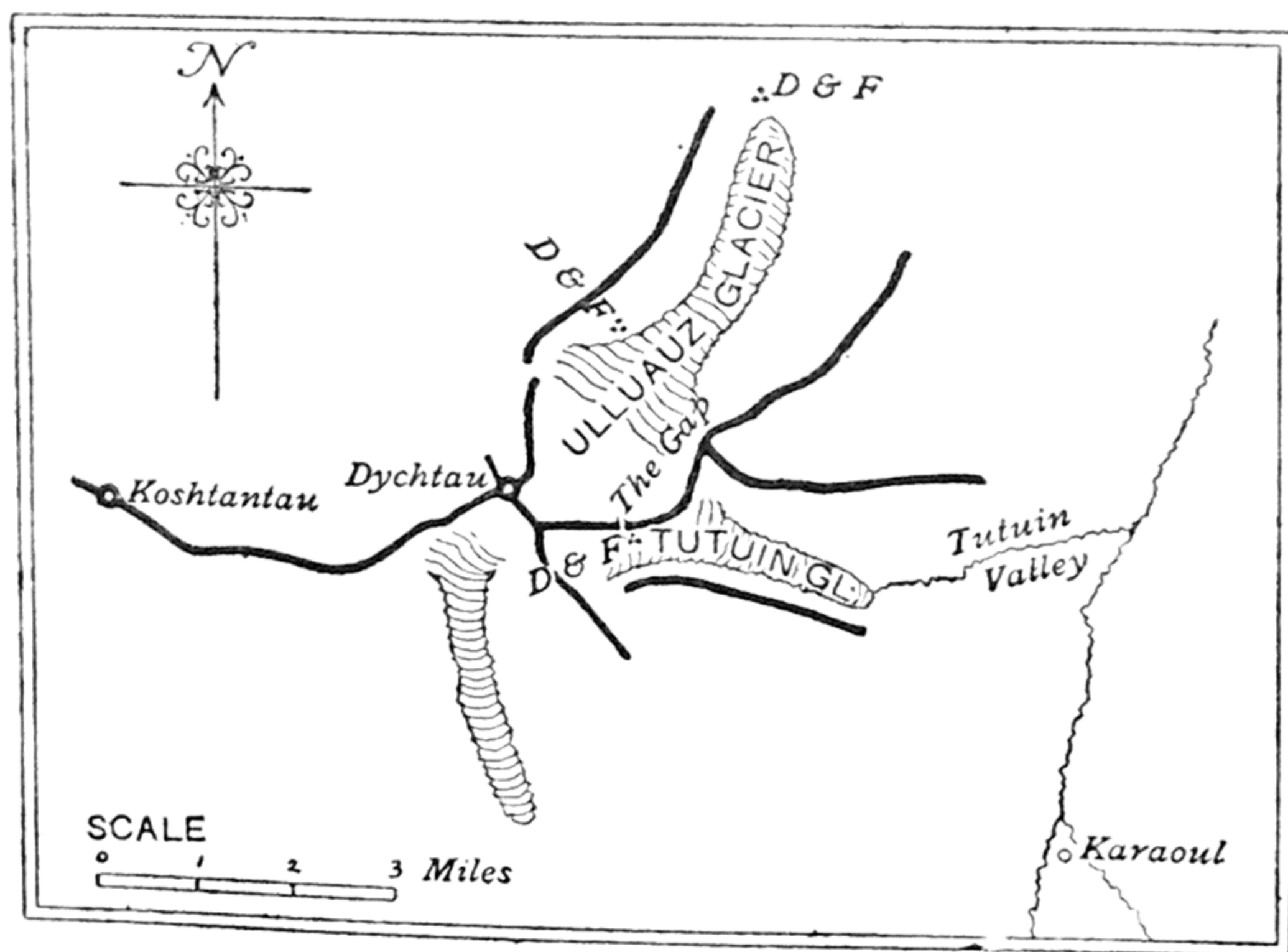
already mentioned, and which was only practicable before the sun had started the daily volleys of falling stones. He did extraordinary things among the most difficult Needles of Mont Blanc. Finally, he went to India in 1895, and was never afterwards heard of, probably being buried by an avalanche from the giant mountain Nanga Parbat. His most notable feat in the Caucasus was the ascent of Koshtantau, another pyramidal peak, which rises in one grand sweep from a glacier 8300 feet below. Woolley also ascended this peak.

Koshtantau is the highest point on the western side of a short range, the eastern culmination of which forms the equally fine pyramid of Dychtau. The latter, however, was far less accessible than its neighbour, and a disastrous attempt to climb it resulted in Freshfield paying that region a third visit.

Late in August, 1888, when most of the alpinists had returned to Europe, W. F. Donkin and Henry Fox, accompanied by the Meiringen guides J. Fischer and K. Streich, remained behind, intending to ascend Dychtau.

At the end of September Freshfield received a telegram from their German servant, saying that they had not been seen or heard of for three weeks. Search was officially made by the local authorities, and it was strengthened by

the Czar's own order; but nothing whatever was found. The local headmen were each and every one anxious to show, either that the adventurous mountaineers had never been in their district, or else they had definitely left it;



Dychtau and its surroundings

and rumours were spread that they must have been murdered, because all four could not have perished in the mountains at once.

The English climbing fraternity of course realized that the very disappearance of all four implied a mountain accident, and they felt confident that the party had been lost while attempting Dychtau; but an uncomfortable

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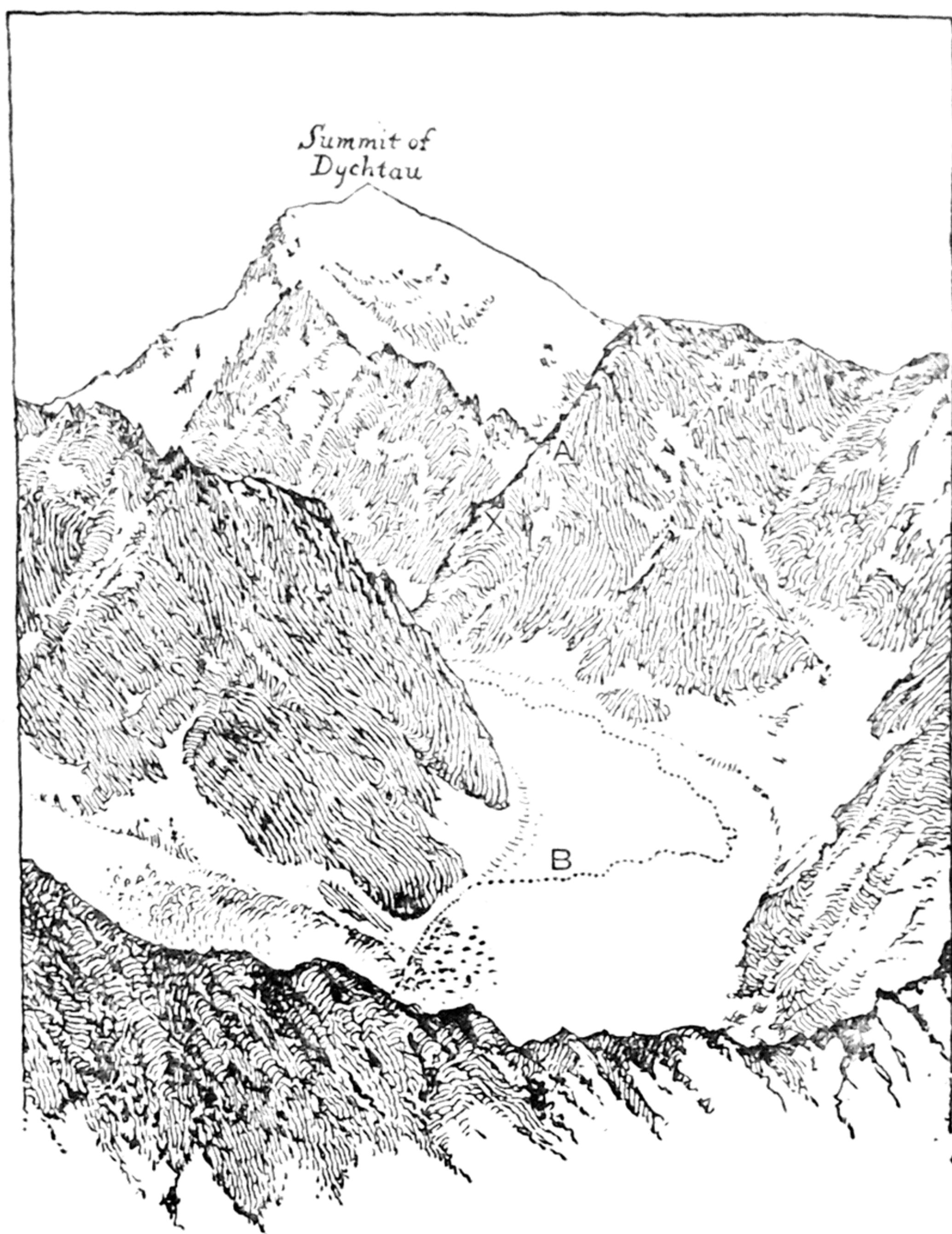
doubt remained until the succeeding year.

In the summer of 1889 Clinton Dent, D. W. Freshfield, H. Woolley, K. Maurer of Meiringen, a young brother of Fischer's, and two other guides, went out there, determined to clear up the mystery.

Dychtau (16,925 feet) is the summit of a series of radiating ridges, one of which runs out to the east. This eastern ridge has on its northern base the snow basin of the Ulluaux or Great Valley Glacier, while its southern foot is similarly swathed in the white mass of the upper Tutuin Glacier; the ridge itself forms a series of serrated peaks of great sharpness, yet a first-rate climber might conceive it possible to climb along its face to where it apparently terminates on the upper part of Dychtau. High up on the ridge a distinct gap or "pass" leads from the one glacier to the other; it plays an important part in our story.

Long before this time Freshfield had reconnoitred the region, and had devised alternative modes of approaching the summit; and he had actually provided Fox with a sketch of the gap in the eastern ridge.

Now Fox and Donkin were known to have camped at the foot of the Ulluaux Glacier; whence they had made one attempt on the peak from the north, but had been frustrated.



Dychtau

A, The Gap. X, The Bivouac. B, Route across Tutuin Glacier

Fox's diary, which contains the account of this, adds the record of a not uncommon moun-

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taineeering trouble, an unhappy night. They were on a cliff north of the peak, hoping to snatch a few hours' sleep before facing the difficulties of the morrow.

“Fischer searched for sleeping place and found a cleft—the rocks sloping upwards. A poor hole, but affording shelter from snow and wind somewhat. The top was so narrow that one could only just squeeze oneself inside; below it widened out a little. The angle was about 30 degrees. We managed to rake down about a ton of rock and loose stones, with which the crack was filled, and made a sort of platform at the base, where Streich and Donkin lay. I hollowed out a seat above, and made a footstool of my ice-axe below. We curled ourselves in our sleeping bags, and tried to be thankful for shelter. Everything was wet and clammy, and a slow drip came over my knees. Position had to be changed every ten minutes, each change sending down a handful of pebbles on Donkin's head. The wind was boisterous. . . . I was just dozing off when I was awoke by a handful of stones from above which clattered about my ears, followed by a large rock which I had thought secure. It came bang on my head and made me see a thousand stars, so that for a moment the hole seemed full of light. In endeavouring to move it on one side I shifted

the ice-axe and sent a wheelbarrow of stones down on poor Donkin's head."

Next day they abandoned their attempt to reach the peak from the north, and were driven back to their tent at the foot of the glacier by bad weather. The last entry in the diary, 28th August, contained these words:

"Weather permitting we hope to start again to-morrow very early and take 3 or 4 days' provisions. Make the Dychsu-Dumala Pass the first day, and camp near its head. Climb Dychtau if possible from the south side the next, and descend to the Dychsu Glacier. Thence to Karaoul."

Karaoul was the name of a pasturage below the snouts of the eastern glaciers from the peak, and it was there that the servant had been waiting three weeks before he gave the alarm.

Considering these facts, Freshfield concluded that if he could identify the "Dychsu-Dumala Pass" he could solve the mystery, at least to the extent of being on the true trail. He was also convinced that this pass and his own high gap in the eastern ridge were one and the same.

The search party therefore went to Karaoul, which lies about six miles south-east of the peak and more than 11,000 feet below it. The tents were erected on a promontory between two roaring torrents, and a reconnaissance from

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a neighbouring height showed Freshfield's gap to be a clear feature in the eastern ridge. The best way to get to it was to follow one of the torrents northwards for a mile or two, and then to turn sharply to the left into the Tutuin Valley; a short stretch was hidden at that point, but higher up they saw that the Tutuin Glacier led towards their objective.

The ascent to the glacier, although arduous, was extremely beautiful. The valley was covered with fallen rocks, the sharp edges of which were toned down by a soft cover of moss; a milky torrent brawled down its bottom, tumbling, spluttering and churning a way past patches of birch and thickets of cream rhododendrons; while the meadows were choked with primulas, pyrethrums, gentians, and forget-me-nots, all struggling for existence with each other and with the long coarse grass.

When the searchers came to the glacier's snout, they found that it was not practicable to ascend upon the ice; for a short distance up it tumbled over a hidden ledge, being broken for a long way into blocks of every shape and size, separated by patches of suspicious blue, and sometimes linked by still more suspicious and sagging snow bridges. At this point, however, they were able to keep on the left-hand side, where sharp, naked rock fragments afforded

a slippery but certain mode of advance; it led them to a convenient camping ground opposite the ice-fall, in a dell which was covered with huge rhubarb-like weeds.

Starting early the next day they soon came to the end of their rough moraine track, and were compelled to take to the ice. With much difficulty the little column wound among and around the gigantic fragments (many of which seemed ready to fall and crush the unwary at a touch), over the fragile and yielding snow bridges, and along the borders of deep cracks, until at length they reached the opposite side of the glacier. One sharp tussle with the final battalion of frigid towers, and they found themselves on the upper glacier, a smooth highway, bordered by pale gray granite cliffs, and winding away up towards the peak.

They followed this easier route for some hours, keeping a sharp lookout for any signs of the missing men, until at last they stood immediately beneath Freshfield's gap. This now proved to be an opening, practicable indeed, but no more; for it stood 1400 feet above them, at the top of an extremely steep cliff; and although snowy places at the top and bottom indicated some possibility of climbing up, there was an ugly bare place in the middle that promised difficulties.

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If, as they had imagined, this was Donkin and Fox's pass, then they must have come over it, and presumably they would descend to the glacier before attempting to climb the peak. Accordingly a careful search was made of the locality, but without result. It was then decided to climb up to the gap, and from that coign of vantage to try to place themselves in Fox and Donkin's shoes, and see what inferences could be drawn. While engaged in this arduous task, "about noon the leader, at the rope's end, suddenly stopped short and gasped out, 'Herr Gott! The sleeping place!'"

It was only too true. There before them, hidden away on a tiny ledge upon the cliff, fenced in with stones, and covered over with ice, was the bivouac of the lost men. From above the frozen cover there peeped out corners of camp equipment and sleeping bags; while a revolver hung in its case on the precipice. The searchers feared at first that the bulky bags contained the bodies of their dead friends; but a few strokes of the ice-axes removed that apprehension. Whatever had happened to Donkin and Fox, they had not perished of cold or starvation.

While some of the party began the long task of breaking away the ice, so as to release the relics, Woolley and Freshfield, with one guide,

climbed up on to the gap itself. The glacier beyond led nowhere. The face of the ridge which had been hidden from them, although it led towards the summit, was covered with thin ice, and in a condition which made it suicidal to venture upon it.

In such circumstances, what would the others be likely to do? Their bivouac showed not only that, but what had actually happened. They had reached the pass, and finding the north side impracticable, had crossed to the southern side and built their eyrie on the wall under the pass. The revolver and bags showed that they intended to return. There were two ways to the summit, and two only. One was to descend that dangerous cliff to the glacier up which Freshfield had just toiled, and then to follow it to its head; the other was to remain high up on the ridge, and attempt to traverse it hundreds of feet above the glacier.

The latter of these alternatives was probably adopted. Somewhere on that glassy wall a man slipped, and tumbling headlong, pulled down the others with him. When they reached the bottom, the constant rain of avalanches would bury them for ever.

A thorough search was made in the vicinity, but nothing further came to light. Ten days later Woolley, while ascending the peak, followed

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the glacier past the places where the dead men might have fallen, but he was equally unsuccessful. He went on to the summit; but nowhere could he see any cairn or other evidence that it had been assailed before. The mountains hold their secrets close.

CHAPTER IV

To Africa's Highest Point

Although the apex of the Dark Continent is not yet on a recognized tourist route, anybody may see it with no more labour than the purchase of a steamer ticket to Mombasa and a railway ticket to Moshi or Taveta. It stands within 200 miles of the ocean. It rises more than three miles vertically above a vast plain. Its base could just be enclosed by a rectangle three corners of which lay at Margate, London, and Brighton. And yet for a long time its very existence was disputed, and it is only seventy years since that most determined, observant, and thorough-going explorer, Sir Richard Burton (who had himself just passed within a short distance of Kilimanjaro), misplaced it by more than 600 miles!

Kilimanjaro, the "Snowy Mountain", was first seen by a European in 1848-9, when the missionary Rebmann got within three miles of its lower zones. A compatriot also saw it in the following year, and they both described its

main features; while it was well known that natives had brought down white stuff from the mountain, which melted into water before they could show it to their king. Yet the idea of a great snow-capped mountain almost on the Equator continued to be received with some doubt until, in 1861, Baron von der Decken set all questions at rest by a special expedition there. He got into the toils of the chieftains who surround the peak, and having lost most of his trade goods, was forced to return. Next year he went again, but he was not successful in reaching the top. It then remained an object of remote curiosity until 1883, when Joseph Thomson, a prince among travellers, spent some time upon it and saw it from many angles. In the succeeding year another great African pioneer, Mr. H. H. (afterwards Sir Harry) Johnston made a determined effort to scale the peak; that feat, however, was reserved for a German traveller, Dr. Hans Meyer, in 1889.

This comparative sluggishness in the examination of one of the world's chief mountains was due not to any natural difficulties, but almost wholly to the human obstacles that had to be overcome ere one could set foot upon it.

A traveller who desired to proceed to Kilimanjaro from, say, Mombasa or Zanzibar, could not move a yard without carriers, and the

courage of his carriers was always inversely proportional to their distance from home. He might start with a motley, excited, chattering horde of 150 or 200 men. By the time Mombasa was out of sight they would be strangely silent and downcast; three or four days later many of them would have discovered mothers who were dying or debts which had to be settled at once, or any other highly unlikely thing; three or four days after that he would be lucky indeed if he still possessed one-third of his caravan.

Although the natives were thus childish and weak-kneed, they had some justification for fear—if there is ever any justification for being afraid. The route to the interior led through the domains of many independent chieftains, always suspicious of each other and usually at war; moreover, raiding parties of Arab slave dealers hovered about the most frequented roads, ready to pounce upon any unprotected caravan. The track—where it deserved such a name—led from dusk to dawn through primeval forest which abounded in natural sites for an ambush; and when, after climbing out of this jungle at last, the perspiring explorer reached the open plateau, what a prospect opened before him! To north, to south, to west, nothing but a dreary plain, bereft of water, of beehive houses, of any form of human

activity; where the burning sun leered down upon the freakish motion of the giraffes and the caravan did its best to avoid the worst frenzies of an enraged rhinoceros.

Assuming that the would-be climber had avoided death by fever or poison in the jungle, or by thirst on the desert plain, he then came to the domains of many tribes who dwelt about the fringes of the mountain. He was regarded immediately as their legitimate prey, to be amused so long as he had any goods to give away, and to be dismissed, or even murdered, when nothing further could be extracted from his boxes. Consequently, if a particular chief "protected" him, war infallibly followed with all the other chiefs, who naturally felt annoyed at losing their share of the white prize. To crown all, much of the lowland around the peak was inhabited by the Masai, a tribe the very name of which caused porters to bolt panic-stricken towards the ocean; expert thieves all, and far bolder than the average negro, so that the only checks to their importunity were a thick thorn hedge or an exhibition of revolver practice.

The usual result of all this was that the explorer, sick, disheartened, with his clothing reduced to rags and his pockets to a state of emptiness, made the best of his way back to

Mombasa, vowing never to enter that accursed country again; yet such is the charm of African travel that the same man might be found in the same place twelve months afterwards ready to start afresh! These are the reasons why Kilimanjaro remained unknown for so long.

The peak, which is 19,455 feet high, rises from a plain only 2000 to 3000 feet above the sea; and being quite isolated it gives an impression of tremendous size. Its lower slopes are cut up into rugged hills and valleys by the numerous streams that spring out of the mountain base, mostly on the southern side; the northern front looks over a desert. In the beautiful cultivated hill country are numerous native settlements, of which Taveta, Moshi, and Maranga must claim our notice. High above all this one sees a broad green band, the forest belt; and above that the brown slopes rise to a plateau some 14,000 feet above the sea. The plateau contains two summits. That on the east, Mawenzi, is a craggy, castellated height of extreme abruptness and savage aspect; that on the west, six miles distant, is a beautiful dome, glittering with ice, called Kibo. Kibo is by far the higher of these prominences.

We can now return to the travellers Thomson, Johnston, and Meyer.

Joseph Thomson was the ideal man to cope

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with the difficulties which have been outlined above. His patience was infinite, his sagacity great, and his courage beyond all question. He had a favourite motto, "He who goes gently goes safe; he who goes safe goes far"; and during five perilous African journeys he never shed a drop of human blood—a marked contrast, this, to the record of some other African explorers of that period.

During his famous journey from the East Coast to Victoria Nyanza, in 1883, he had to pass Kilimanjaro. At that time the Masai, excited by an affray with another traveller in which blood had been spilt, were ranging the country, burning and killing; and in order to avoid them Thomson thought a little time might usefully be spent on the mountain. Accordingly he directed his caravan to Moshi, where a famous chief named Mandara held sway.

Mandara was a man of whom very different opinions were entertained. Some travellers thought him a prince, others described him as a rogue; all agreed that his exactions were unbearable. He removed from Thomson's care everything which the explorer would yield; nor would he release his "guest" until he had secured his "own gun, a complete suit of clothes, an iron box, and numerous other articles".

Thomson made no attempt to climb to the top

of Kilimanjaro; but he stayed some while in its forests, plant-collecting, and he reached an altitude of about 9000 feet. Eventually he was forced to retire to the coast to reorganize his caravan; and when he returned he passed round the northern side of the mountain, a barren wilderness which was tenanted only by the rhinoceros, the zebra, and the giraffe.

Meanwhile, much curiosity concerning this ancient volcano had been excited in England. The British Association voted £1000 for its exploration, and the task was entrusted to Mr. H. H. Johnston, then a promising young explorer. Johnston went to Mombasa, organized a caravan, and leaving in May, 1884, arrived at Mandara's early in June; his journey having been less troublesome than usual, thanks to the favourable impression made by his predecessor.

He soon became firm friends with the purloining autocrat of Moshi. Mandara gave him permission to erect a settlement, high upon a hillside on the mountain; and here his industry and power of organization soon built up a little town, with houses for his followers, a kitchen garden (sown with vegetables he had brought up from the coast), a fowl-run, and other conveniences. As in so many other parts of the Kilimanjaro slope, the garden had to be irrigated; for which purpose the natives

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have a clever sytem of wooden pipes and tiny canals, into which the spring water is run.

Unhappily, however, association with Mandara meant war with all the other chiefs. Stragglers were ruthlessly cut off. It was impossible to climb high, or even to do the collecting of plants and animals which was one of his chief reasons for visiting the peak, without an escort of black soldiers. Battles resulted, in which Mandara, despite his cupidity, showed a high sense of the duties of a host by fighting Johnston's battles. The natives doubtless thought these encounters very deadly, although they had a humorous side. Once, when the opposing armies had joined in combat, and victory was doubtful, Johnston came up late in the day, bringing twenty followers and a packet of fireworks.

"No sooner had darkness set in," he says, "than I blazed out on the astonished natives with Bengal lights, red fire, Roman candles, serpent squibs, and lastly a magnificent flight of rockets. . . . When the first rocket rose with a flaming shower and a shrieking rush into the air, and then broke into a mass of falling stars, friends and foes alike fled in dismay." On another occasion, nothing stood between Johnston's small party and a much larger array of howling savages but his theodolite, which stood

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on its tripod, pointing at the foe, but quite neglected. They eyed it suspiciously, withdrew, and muttering about the white man's magic, retired for a sufficient space to enable Johnston to reach a place of safety.

These hostilities clearly showed that his purpose could never be achieved while he remained with Mandara. He therefore bade that chief farewell and retired to Taveta, where he formally met the leaders of the opposition. Now that they had gained their point, they promised to help him, and recommended him to attempt the climb from Maranga, a village higher up than Mandara's.

Accordingly he moved camp once more. He followed the winding native paths among the dense undergrowth of the forest belt, worked his way through the moss-enshrouded and stunted trees beyond, and emerging on the grassy slopes above, established another little village nearly 10,000 feet above the sea. This formed his head-quarters during the remainder of his four months' stay on Kilimanjaro.

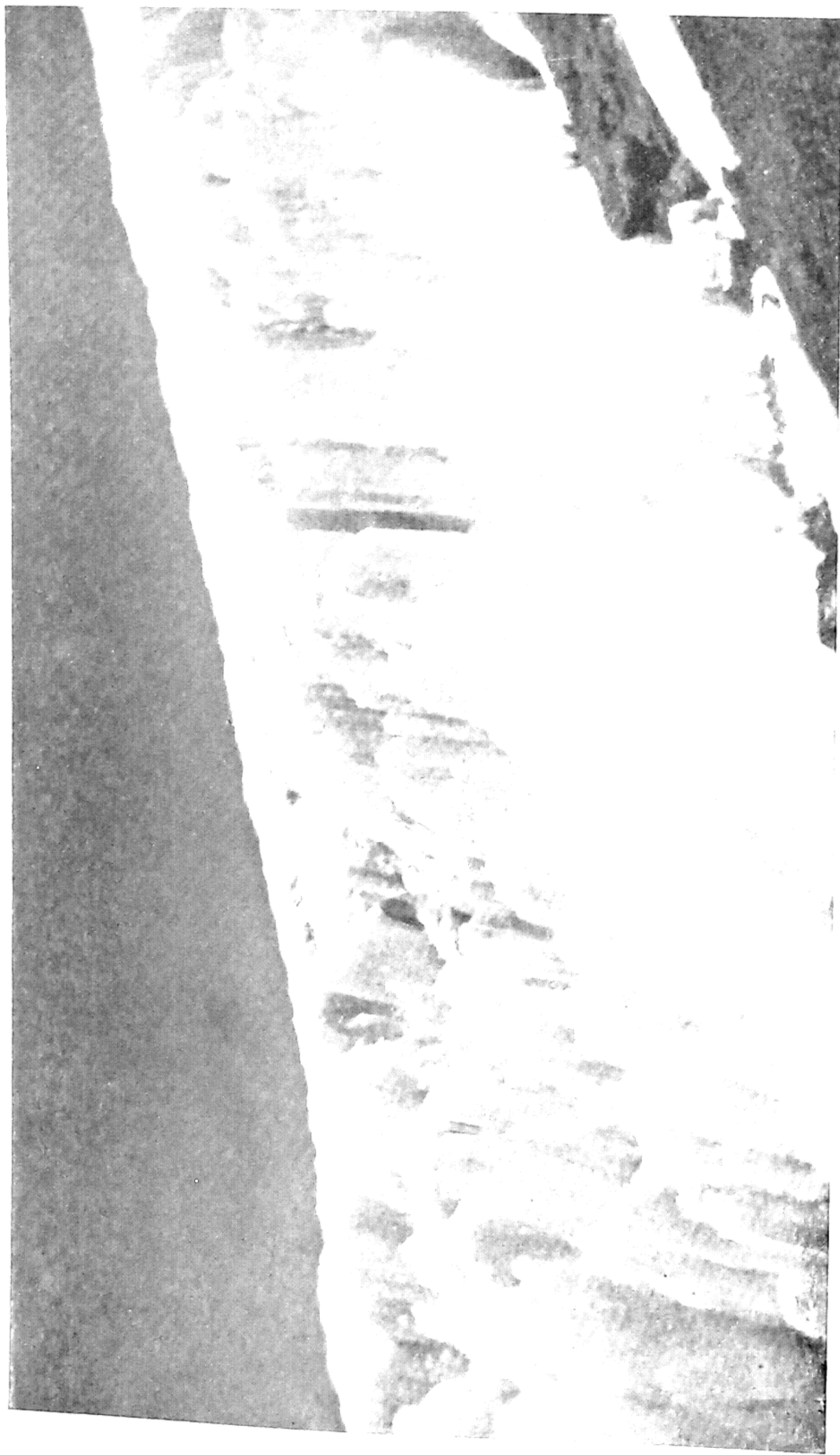
Despite the great altitude, wild animals were quite common up there. Deer and antelope wandered on to the plateau beyond, elephants were seen more than once, panthers lurked among the rocks, and other flesh-eaters were not far below. The settlement was therefore

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protected by a strong thorn fence, and while this was being erected, Johnston went on higher to examine the prospects.

He turned first to the east, where the lower peak Mawenzi met his eyes. Scrambling over the stones to its base, he looked up at a mass of jagged, vertical cliffs, stained a rusty red, with fantastically castellated summits, and no easier of access than a stone wall. He then directed his steps towards Kibo, the noble white dome of which rose far above him; it was tantalizingly lost to view, being hidden by clouds, but from a few fleeting glimpses he felt justified in attempting its ascent.

The summit was so far above even his second camp that an intermediate resting-place was essential. His men, accustomed to the great heat of the plains, did not relish the keen mountain air, still less their proximity to the demons whom they supposed to inhabit the upper regions; nevertheless he induced three Zanzibar porters to carry his collecting apparatus, food, &c., up to the plateau, at first over easy grass, then across burnt patches of heather, then over rocks and stones, the cracks between which were filled with beautiful pink everlasting flowers. At about 13,000 feet they crossed a veritable paradise. A tiny crystal-clear stream gurgled over the stones on its way



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ON THE NORTHERN EDGE OF THE RATZEL GLACIER, KILIMANJARO

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(Chapter IV)

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down the slope; it was overhung with long green moss and ferns; and on its banks were alpine flowers and beds of thistle, besides the homely flight of bees and wasps. Not daring to strain his men's fears too far, he decided to camp about a thousand feet higher; and he picked on a sheltered hollow where they would be out of the wind, and ordered them to make a fire.

He then pushed on alone towards the upper regions, much to the dismay of the Zanzibaris, who thought he would inevitably be torn to pieces by the mountain gnomes. It had been more or less misty all day, and his objective was lost to sight; but a number of smaller cones rise from the plateau, and one of these, which he had carefully noted, served as a guide. The mist opened for a moment when he had just passed 15,000 feet, showing him a glimpse of the glorious white dome ahead; then the curling wreaths enfolded him in their damp embrace again and he had nothing to guide him but the fact that he continued to move uphill.

How wet and cold it was up there! The rocks were clammy and slippery, and he stumbled frequently. It was uncannily quiet, so that the clatter of his boots, the slipping of the stones, the beating of his heart, acquired un-

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reasonable prominence. A grey pall hid everything more than a few yards away. He felt (as indeed he was) tremendously and utterly alone; and the dangerous nature of his enterprise, the knowledge that in the event of an accident not a soul could help him, and the possibility of being lost or falling down a precipice in the mist, would have deterred a less determined man.

Suddenly he trod on something white. It was snow! Before he could recover from his surprise the mists unfolded, giving him a momentary glimpse of a vast snow-covered ravine at his feet; another instant, and all was hidden again. Exercising the greatest care, and pausing frequently to rest, he still tried to fight his way blindly onwards; and for an hour he continued in this way, always ascending. Then, without warning, he fell to the ground, assailed by that most sudden and nauseating complaint, mountain sickness. For a time he could only lie and gasp for breath, powerless to exert himself.

"I felt," he said afterwards, "as if I should never more regain the force to move, and must remain and die amid this horrid solitude of rocks and snow."

A little brandy, however, drove the blood through his chilled veins. He summoned up sufficient resolution to boil water, and thrust a

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thermometer into it. The height was 16,315 feet. It is an extraordinary feature of mountain sickness that men who can and do ascend much higher often collapse at about this level. We shall have something more to say about that complaint in the next chapter.

For Johnston to have continued longer would have been madness. It was late in the afternoon. The summit, always hidden from his view, was 2000 feet higher by his own reckoning (actually it was 3000 feet). Night would come on with tropical abruptness, and the temperature would fall far below freezing point. If he stayed up there he would probably be stiff and lifeless the next morning.

Accordingly, he descended as fast as he could, the symptoms of sickness declining as the air pressure increased. The secondary crater which he had used as a guide-post on the way up proved equally useful now; especially as he was surrounded by mist and chased by the advanced guard of a storm. His thoughts naturally dwelt on the prospect of rest and warmth in the hollow below; imagine his dismay, therefore, on clambering over the rocks which guarded it, to find the place empty and the men gone! Not only had they fled in panic, but they had taken everything with them, and if he was to avoid a night in the open he would

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have to be quick. In hot anger he left the camp, "at a pace that soon quickened into an irregular run". He slithered over the boulders, waded the stream, crossed the heath and the wet grass once more; and then, far below, he saw the light of his camp fires shining through the bushes. When at last he forced open the gate of the fence and entered the enclosure, his arrival nearly created a panic, for the poor natives thought it was his ghost! However, a few words to the culprits soon undeceived them; he could not scold them as he might have done, for they were all genuinely delighted to find him alive again.

On the next morning he made another attempt to scale Kibo, this time unaccompanied; but although he reached the snows, the strong wind, the mist, cold and lack of time forced him to turn back. Moreover, his men were by now knocked up through continuous exposure to severe cold and the unusual work, his funds were running low, and it was only too clear that he could not complete his conquest. Accordingly, he gave a reluctant command to retire, first to Taveta and then to the coast; where he arrived, bearing rich collections, just eight months after he had left for the mountain.

One incident during this retreat shows Johnston's admirable resource. His small caravan

happened to run into the midst of about a thousand Masai, who were out on a raid. He went at once to the Masai, brought forward a pale negro who happened to be in his band, and warned the raiders to keep away, as the caravan was suffering badly from smallpox. Within an hour every Masai warrior had vanished!

In 1887 Dr. Hans Meyer, a German naturalist and explorer, tried to ascend Kilimanjaro. He followed Johnston's route, and like him made his attempt from the side of Maranga. He was fortunate enough to induce the natives to carry his equipment up the higher slopes to the plateau beneath the two summits, and from that favourable point he assailed Kibo.

The climb proved arduous but not difficult. The ridges of the peak were covered with boulders large and small, mingled with sand and loose stones; and by dint of slipping back a yard for every two yards gained, the Doctor reached such a point that the crags of Mawenzi stood below him. He was then pulled up by a new and wholly unexpected obstacle.

Ordinary glaciers either rest in valleys or dapple the hollows of mountain-sides with white. Their snouts, though sometimes cliffy, are usually broken down sufficiently for an attack upon them to land the climber among the

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mud, stones and dirty ice at the top; and even when one cannot surmount them by a frontal assault, it is almost always possible to creep up the rocks at their sides and then descend at some convenient point.

But the glaciers of Kilimanjaro are not like this. They form part of a true ice-cap, sprawling down over the mountain top as treacle might run down the sides of an inverted basin; and their congealed masses end in vertical cliffs, 100 to 200 feet high, apparently insurmountable (at least from the locality which Meyer had reached). The glittering blue ice, in fact, forms a gigantic rampart; like most natural ramparts, it is broken down in a few spots, but for the most part its walls, which are beautifully fluted by thousands of vertical grooves, forbid any further advance.

Here, then, the German doctor turned back. The altitude was 17,880 feet. He returned to Europe, not to descant on his success, but to organize a second attempt.

In the following year we find him once more in East Africa, with better equipment, besides a caravan of 230 men; but before he could even reach the mountain a revolt broke out on the coast, and spreading inland, affected his caravan. His men deserted wholesale; no assistance whatever could be obtained from the

local chieftains, and he was forced to return, accompanied by a handful of loyal adherents. On reaching the sea he was captured by an Arab slaver; and the unfortunate doctor, bullied, threatened, and loaded with chains, remained in the most miserable plight until his friends subscribed a ransom.

Despite these unhappy experiences, he was just as determined as ever to ascend Kilimanjaro. He went back to Europe for the second time, enlisted fresh sympathy and support, and by August, 1889, was back in Zanzibar.

The prospect was distinctly black. The coast was undergoing a blockade, hence his arms and ammunition had to be left behind. He met with difficulty when he sought permission to buy these necessities locally. To crown all, his equipment, including his climbing irons, had been sent by mistake to Colombo, and by this time was probably being eaten by rats on the floor of a Ceylonese warehouse. The gallant Doctor, however, rose superior to his misfortunes. He scoured the highways and byways of the island for men; he purchased stores; he extracted a permit to buy arms; and by the end of August he was on the mainland, en route for the peak. With him went a trained alpinist, Herr Purtscheller.

They journeyed first to Mandara's, but their

reception by that fickle chief was such that they went on to Maranga. From this centre two high camps were established, one being a little below Johnston's lower camp (9200 feet), and the other far above his higher one (14,270 feet). The upper camp, which was on the plateau, was located in a hollow surrounded by lava blocks. It was intended that the two explorers, with one native, should remain at this spot as long as needful, being supplied with fresh food from below every third day. This arrangement worked admirably.

A large rib of lava jutted out from the mountain-side towards their camp; it was bordered by a deep gully, and it appeared to offer an easy means of gaining height. The base of this ridge was some distance away, and they started towards it at 2.30 on the morning of 3rd October, stumbling over the stones by lantern light. Dawn found them high up on the spur, only to discover an impassable gap ahead, and no alternative but a descent of 500 feet to the ravine at their side; thanks to this mishap, 7.30 a.m. found them still no higher than they had been two hours before.

Progress now became easier, although it was very exhausting work plodding up the yielding slope, with one's heart beating audibly and one's lungs refusing to function properly. At

To Africa's Highest Point 121

17,220 feet they boiled the thermometer to ascertain the altitude; here they rested for half an hour, admiring the white, woolly sea of clouds below and the savage red battlements of Mawenzi which overtopped them. Then on they went again, to the snow which seemed so near and yet never came any nearer. At 10 a.m. they were actually beneath the frigid walls at last; more than 18,000 feet above the sea, and yet still over a thousand feet below the top.

They found a place where the ice sloped up at only 35 degrees; but this was a sufficiently sharp gradient, when every step had to be cut with an axe, and every movement was attended by a sense of fatigue. As soon as the gradient decreased, and they mounted the crown of the dome, another difficulty arose. The ice was covered with deep snow, the upper part of which had hardened into a thin crust; and the effect of weather changes on the crust had been to break it up into ridges and hollows more than six feet deep. "We frequently broke through as far as our breasts, causing our strength to diminish with alarming rapidity. And still the highest ridge of ice appeared to be as distant as ever."

However, all trials come to an end at last, and by 2 p.m. they were looking down into the

crater. The final 1000 feet had taken four hours; and to reach the actual summit—one of three rocks that rose from a remote point on the crater—was now impossible. For the present, therefore, they contented themselves with observing their surroundings.

They were on the edge of a gigantic wall, the grey and rusty red side of which fell inwards almost vertically. Six hundred feet below them, in the place where fire had once glowed and poisonous gas bubbles burst, there lay a placid lake of ice; to the far side of the crater it spanned more than a mile. Away to the west the wall had been breached, and through this breach the ice was slowly thrusting its way. A beautiful little cone, 500 feet high, rose out of the ice lake; it was a lesser edition of the great mountain, and as dead as its prototype.

The two explorers then descended to a more comfortable level, where they spent the night. Three days later they were again on the top. The three little prominences on the crater rim were duly climbed. The mountain ritual was duly observed. Kilimanjaro was duly added to the list of conquered summits.

Dr. Meyer made the altitude 19,700 feet, a little under four miles; more recent observations have reduced this figure, but only very slightly.

CHAPTER V

Himalayan Peaks and Karakoram Glaciers

There are three kinds of peaks in the stupendous mountain ranges commonly called the Himalaya: those which can be climbed but are inaccessible, those which are accessible but cannot be climbed, and those which are neither accessible nor climbable. About 1100 summits exceed 20,000 feet in height; owing to their remoteness from human haunts many are identified simply by numbers, while many others have not been identified at all. The second highest mountain on the globe—K₂—comes within the former category.

In this vast region, twice the length of Britain and 100 miles or more broad, all the world's best mountaineering talent has displayed its powers, from Sir Martin Conway to Mr. F. S. Smythe (not to mention the older experts, the Schlagintweits, the Stracheys, Montgomery, Graham, &c.); yet with the two exceptions of Kabru and Kamet not a single

peak exceeding 24,000 feet has ever been conquered, such is the difficulty of Himalayan mountaineering.

We must not only confine our attention to one or two limited districts, but we must also restrict it to a few outstanding achievements, otherwise we shall overflow our limits.

North of the beautiful hills and vales of Kashmir stands the vaguely defined Karakoram, a region of savage grandeur, almost untenanted by man, shunned by animals, and naked and barren to the last degree. Scores of summits shoot up into the deep blue sky, their sides like sheets of glass from polishing by countless avalanches, their tops splintery and sharp, or overhung by delicate but highly dangerous snow fringes. As a rule their bases sink into the eternal snows; for nearly every valley starts at a glacier's end and terminates either in another ice stream or in a madly leaping glacial torrent.

The few travellers who venture into this region of desolation and loneliness, where even firewood has to be carried from camp to camp, are forced to make an intimate acquaintance with the glaciers, for they are the natural highways. Five such ice-streams far out-measure all the rest, and four of them, lying in a zigzag line, afford a continuous depression

between unscaleable mountains for a distance equal to that between London and Sheffield. It was frequently rumoured that in past days, when the climate may have been a little milder, they formed a route between the mountain villages; but if that were so—and it is by no means certain—then they cannot have been traversed very often. If one starts at the village of Hispar, in the west, and proceeds generally to the east, one has to mount the great Hispar Glacier, nearly forty miles long; at the top, more than 17,000 feet above the sea, is a wilderness of nearly flat snow, which forms the head of the second glacier, the Biafo. Following that down to its foot, and then traversing a small extent of barren glens, one comes to the base of the third of these remarkable ice streams, the Baltoro; one rises up its broad bosom for 36 miles, only to find oneself in a tremendous hollow, where peaks that are giants even in the Himalaya soar skywards in every quarter. Between these peaks are a few very difficult gaps, two of which lead to the head-streams of the largest glacier of all, the Siachen or Rose. Assuming that in such a journey one has escaped the innumerable dangers attendant upon it—that one has not been crushed to death by a giant stone falling from its icy pedestal, or smothered by an avalanche,

or drowned in one of the slippery-sided trenches where rivulets run like mill streams, or engulfed in a deep blue chasm—an impression is brought away of stupendous forces ever at work destroying the mountains, carrying away the countless angular fragments, and by the transport of cloudy silt building up the wheat fields and the orchards far below.

Thither, in the summer of 1892, went Mr. (now Sir) William Martin Conway, an archæologist, a geographer, and an alpinist who already possessed a great reputation. His object was to ascertain the reality or otherwise of the ancient route up the glaciers; and if, during the expedition, any opportunity occurred of climbing a few peaks four or five miles high, so much the better. He was accompanied by a few Europeans, including Lieut. C. G. Bruce, of the 5th Gurkha Rifles, and Mattias Zurbriggen, one of the most famous Swiss guides.

They had already had a foretaste of Himalayan conditions in a snowstorm of a week's duration and three unsuccessful climbs. The glaciers offered fewer difficulties, although not free from danger. Near the foot of the Hispar they had to cross a side gully. "We heard," says Sir Martin, "a sound like thunder, and saw advancing downwards at a great rate a huge black volume of mingled mud, water, and

rocks, which filled the whole gully and was making for the river below. The rocks that formed the vanguard of this hideous thing were many of them as large as ten-foot cubes, and they were rolled round and round by the mud as though they had been pebbles. In half an hour this mud avalanche had completely passed, and we were essaying to cross the stream when a second and larger one hove in sight above, and we had to hurry back to escape it. Three times did the mountain discharge these black monstrosities upon us before we were able to seize a favourable moment to cross the gully that barred our advance."

In such an expedition, where supplies of every kind had to be taken along, a large crowd of native porters or coolies was essential; and these men, not unnaturally frightened at the dangers confronting them, were a constant source of trouble and delay. Like all coolies, they desired to carry as little as possible, to start as late as possible and to finish the day's march as early as possible.

Zurbriggen, who by nature was a strong-willed and sharp-tempered man, and spoke his mind freely to his employers or anybody else, handled them excellently. At the crossing of a dangerous pass, the coolies "kept on throwing down their loads and refusing to advance. Again

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and again he had to go down and help the men up one by one, which he did with the greatest kindness. The coolies fully realized the value of his help, and when all the difficulties were over, they fell on the ground and kissed his feet, saying that thenceforward they would follow wherever he chose to lead."

The thirty-seven-mile stretch of the Hispar Glacier necessitated six camps. The expedition then descended the equally long Biafo Glacier, the lower part of which is so completely hidden by frightful moraines that it looks like a stony wilderness, the ice being wholly buried under the rocks and mud. The Biafo Glacier is almost crevasse-free, consequently the melting snow transforms the surface into slush, and through this the explorers had to force a way, knee-deep in mud.

Near the snout of the Biafo Glacier is the little high-level village of Askole; from this place the expedition proceeded up the third great ice stream, the Baltoro, at the head of which a wonderful collection of high peaks met their gaze. A branch glacier to the north led straight to the foot of the awe-inspiring precipices of K2, 28,250 feet; a giant whose huge pyramid made the lesser summits—themselves three to four miles high—seem mere pygmies. Near by were Broad Peak (27,133 feet), the



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LEAPING THE SÉRACS

On summit of 800-foot high ice-fall spanning the Chogo Lungma Glacier some five miles below its origin

By kind permission of Dr. W. Hunter Workman

(Chapter V)

Gasherbrums (26,000 feet), and Hidden Peak (26,470 feet). Still nearer, and blocking the head of the Baltoro Glacier, rose two other summits, not hitherto marked on any map; they were connected by a high gap or saddle, and their height was about 25,000 feet. The more northerly of these twins Conway named the Golden Throne, and he determined to attempt it.

As the front of the Golden Throne seemed quite unassailable, it was decided to work round to its rear. This necessitated four days of hard work on a tremendous ice-fall; at the end of which three successive camps were pitched on the snowfields above, at 18,000, 19,000, and 20,000 feet above the sea respectively. From the last of these they attempted to climb their mountain; but after having got 3000 feet higher, and within some 300 feet of the top, found that they were not on the Golden Throne at all, but on an adjacent and much lower summit! They completed the climb, named the mountain Pioneer Peak, and prepared to try again, when an onset of bad weather, coupled with shortage of food, forced them to abandon the enterprise.

Apart from Graham's ascent of Kabru in 1883, this was the first climb of a mountain more than $3\frac{1}{2}$ miles high. Its achievement raises several questions which we must try to grasp

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before proceeding with our narrative. They all relate to the effect of great height on a climber, commonly known as mountain sickness and mountain lassitude.

At about the level of Mont Blanc's summit many people, otherwise in perfect health, are apt to be attacked by nausea, sickness, and intense headache. I can vouch for the last-named from my own experience. It is as if a band of iron were being tightened around the temples until the sufferer can hardly bear any more; after a time, however (a few hours to two days), it passes off. Some people suffer much from shortness of breath and lassitude at the same height, but others are not affected. When one ascends to four miles or more, practically everyone experiences the same symptoms, though not to the same degree. The pace becomes funereal. It is irritating even to move about, still more so to cook food and drive in tent pegs. One frequently stops and gasps; when after a rest the lungs have got more air, the complaint passes off until these organs once more feel the scarcity of air, when the whole process has to be gone through again. In the worst cases the sufferer wants to lie down and die, and nothing will relieve him but removal to a lower level. Without exception all climbers become slower and slower, and he is a good

man who at more than four miles of height can climb 200 feet in an hour. These are the main difficulties in the way of ascending such peaks as Everest. What means have been employed to overcome them?

The first and most obvious means, the use of oxygen, is not universally approved; yet its need is patent to all. You can conceive the air at sea-level as comprising an immense number of minute globules, flexible as soap bubbles, and closely pressed together by the weight of the air above. If one ascends to say a mile or two miles, the weight of overlying air is enormously less; consequently the globules are subject to less pressure, and are able to expand. Thus when a man breathes at sea-level he takes in, let us say, 10,000 globules of air at one breath; but on the summit of Mont Blanc he might take in less than 5000, since each globule occupies a so much larger area. To overcome this difficulty oxygen cylinders have been invented, which contain the life-giving gas in concentrated form. They were first employed on the Everest Expeditions of 1922-4, Captain Finch being the greatest exponent of the method; but their weight—about 5 lb. each—was a serious disadvantage.

An alternative method of dealing with the shortage of oxygen is known as acclimatization.

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Some climbers believe that by staying up among the heights long enough, the body so adjusts itself to the conditions there that the lightness of the air ceases to be important; others, however, assert that the longer one stays at great levels the weaker one gets. There is never likely to be any agreement between these disputants, because both methods have produced great successes.

We can now return to our main theme, having at the back of our minds the thought that every climb above 19,000 feet involves gasping like a fish, besides the usual gymnastics of mountaineering.

Passing over several subsequent explorations of the Karakoram glaciers, we come to another record climb, made nearly twenty years later by the Duke of the Abruzzi.

The Duke had been nurtured in the atmosphere of mountains. The Alps were his playground. In 1895 he ascended the Matterhorn by a difficult route, accompanied by Norman Collie and A. F. Mummery. He had then gone to Alaska, where he had visited, seen and conquered Mount St. Elias, one of the noblest mountains in the world. Following an attack on the North Pole, in which his crew just passed Nansen's farthest, he had been attracted to Africa, where the mysterious Mountains of the

Moon were baffling explorers and climbers alike. The Duke ascended the mountains and mapped them once for all. He was now, in 1910, seized with the truly royal ambition of conquering a real giant; and June of that year found him on the Baltoro Glacier, *en route* for K2.

A tremendously steep ridge rises from south-east of K2, almost bereft of snow, but affording a way that was at least free from avalanches; but one attempt at climbing this convinced the Duke that K2 was impossible. If such a mountain were to be ascended at all, tent platforms must be placed at intervals on the wall, just as they had been on the Matterhorn; but whereas the Swiss giant could be conquered by a single day's hard work, the Himalayan peak had 10,000 feet of precipice above the glacier at its foot, and by no means could one climb at more than half the pace possible at a lower altitude. The rocks were so bad, moreover, that tents could only be got up by driving spikes into the mountain and fixing ropes for the porters; and there was not nearly sufficient time available for this.

Accordingly, K2 was abandoned; but before returning the Duke cast around for one among the many local giants which he might carry home in his bag.

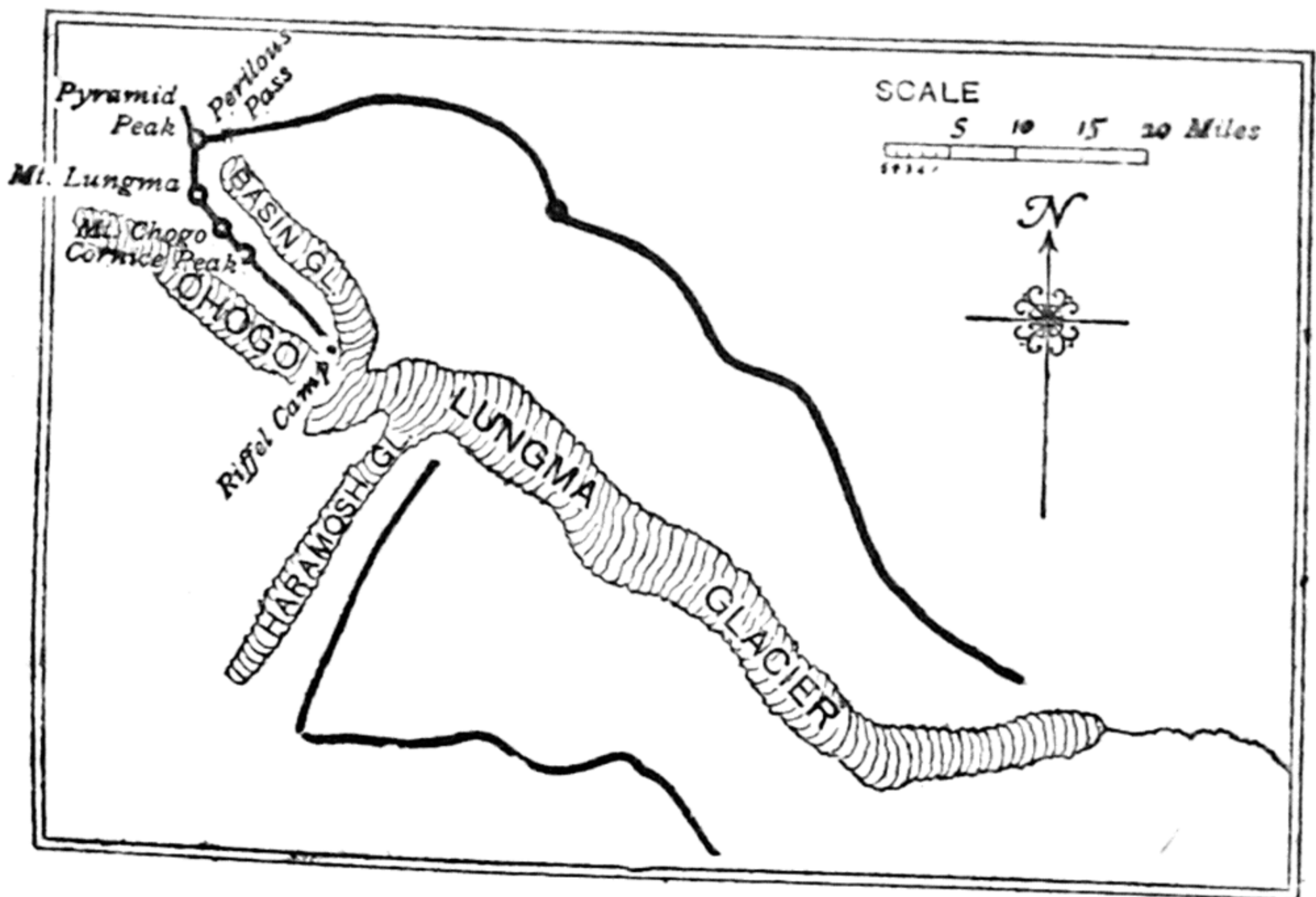
His choice fell on the Bride Peak, a most

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beautiful snowy pyramid, standing in an angle at the head of the Baltoro Glacier, its front defended by a savage array of needles and ice-falls. It was linked by a high gap or saddle to Conway's Golden Throne; and by getting on this gap, a practicable jumping-off ground would be available. Despite deep snow, dangerous clefts, and killing winds, the thing was accomplished. Supplies, tents, and guides were perched on the icy wall between the two summits, 20,778 feet above the sea. From the saddle a ridge, sharp as a knife-edge, rose towards the summit of Bride Peak. An advanced camp was built on this, almost 1000 feet higher; and from that eyrie the Duke and three guides (the brothers Brocherel and J. Petigax) attempted the ascent. They had only attained 23,300 feet, however, when a violent snowstorm drove them back again; but the whole party clung to the saddle, determined not to be beaten without another effort.

At last, after five days' misery, the weather brightened sufficiently to make an attempt practicable. It was foggy, however, so that the ridge required the greatest care. Rising slowly but steadily, the Duke attained 24,600 feet above the sea, when the mist became so dense, and the wind was so furious, that he was forced to stop. On one side the ridge sloped away at

a steep angle into the abyss; on the other it actually overhung the abyss, being, in fact, a snow shelf like that which Tyndall had spent such anxious hours upon when he ascended Monte Rosa. In this miserable plight, not daring to go on, not willing to go back, the Duke



Chogo Lungma Glacier

stuck there for two hours; but the weather never changed, and reluctantly he was forced to return. This ascent far surpassed anything achieved in altitude until the post-War attacks on Mount Everest.

A short distance south of the Hispar Glacier is another large system of ice rivers, mostly tributaries of the large Chogo Lungma Glacier, some thirty miles long and two to four miles

wide. This region was thoroughly explored by Dr. and Mrs. Workman, whose six expeditions to the Himalaya resulted in some new mountaineering records, besides valuable additions to the maps.

On their first visit to the Chogo Lungma region, in 1902, they took a topographer, an Italian porter, 50 to 150 coolies, and the guide Zurbriggen; the latter, since his crossing of the Hispar, had driven his axe into the highest point of South America, and had also come within an ace of losing his life in New Zealand, as we shall narrate later.

Like most of the expeditions into this region, they started from Srinagar, the picturesque capital of Kashmir; and after traversing the barren and rugged valleys of the Indus and several of its branches, they arrived at Arandu, a little mountain village of flat-roofed stone houses, where pigs and poultry herded with human beings, and where the bitter winds blew straight down off the surface of the Chogo Lungma Glacier. Nevertheless, this place, like most of the frontier villages, had its vegetable plots and grain fields, carefully irrigated by the tapping of an ice-cold stream; but the apricots, the walnuts, the apple and other fruit trees of similar places did not flourish there.

At Arandu the final disposition of coolies

was made, a long and vexatious job. The local headman, whom our travellers found to be more honest than most of his kind, and far less afraid of the mountains, acted as a general suzerain, besides accompanying them some miles up the glacier.

Immediately beyond Arandu, and seeming to threaten it with destruction every year, was a great mass of dirty rock fragments, mixed with ice, and subject to sudden slumps as portions rolled and slid down from the top. This was the terminal moraine of the glacier. Advancing at first along its side, and then down the centre of the ice, the party traversed some twenty miles by easy stages; the ice stream then made a sharp turn to the north, and in the angle between it and a minor glacier (the Haramosh) was a rocky promontory: from its general resemblance to a well-known Swiss feature, it was named the Riffelhorn. Despite the height of 14,000 feet, there was still some grass on the flatter places for the sheep and goats that had been driven up; rocks afforded a convenient home for the coolies; and tents were set up for the Europeans. This camp formed their permanent base during the next month. It was not established without much labour in relaying the goods from Arandu; in addition to which, the junction of the two ice streams forced both

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of them into huge cubical masses; and the laden men had to scramble round and under these quaking columns, with the certainty of serious harm, or even a fatality, should the ice tumble down on them. A minor but characteristic trouble was that the goods lost in quantity all along the route, grain sacks arriving half empty and sheep unfortunately disappearing down crevasses, whence by some strange chance they found their way into the homes of the natives; for most of the people with whom the Workmans had to deal proved expert pilferers.

Up to this point the glacier, apart from its great size, had not differed in any way from other large ice streams. Its white surface was marked by chains of black rocky hillocks, composed of countless frost-riven fragments that were slowly but inexorably travelling on the ice to the glacier's snout. The explorer prefers even the risk of tumbling into crevasses to the wearisome walking on these moraine hills, where every step is a slide and the sharp jolts and wrenches strain both the temper and the ankles. The clean ice was diversified by the usual number of watercourses, lakelets, and sharp little pyramids, and by more than the usual number of quaking towers and pillars; towards its edges it was heavily crevassed. Apart from these difficulties, it was no joke to

tramp over the icy thoroughfare day after day, at an altitude approaching that of Mont Blanc, and in a sun temperature of 180 to 190 degrees; for the ice, confined between steep mountain walls, radiated the heat so fiercely that lips cracked and the skin blistered repeatedly, making conversation and the eating of solid food most painful.

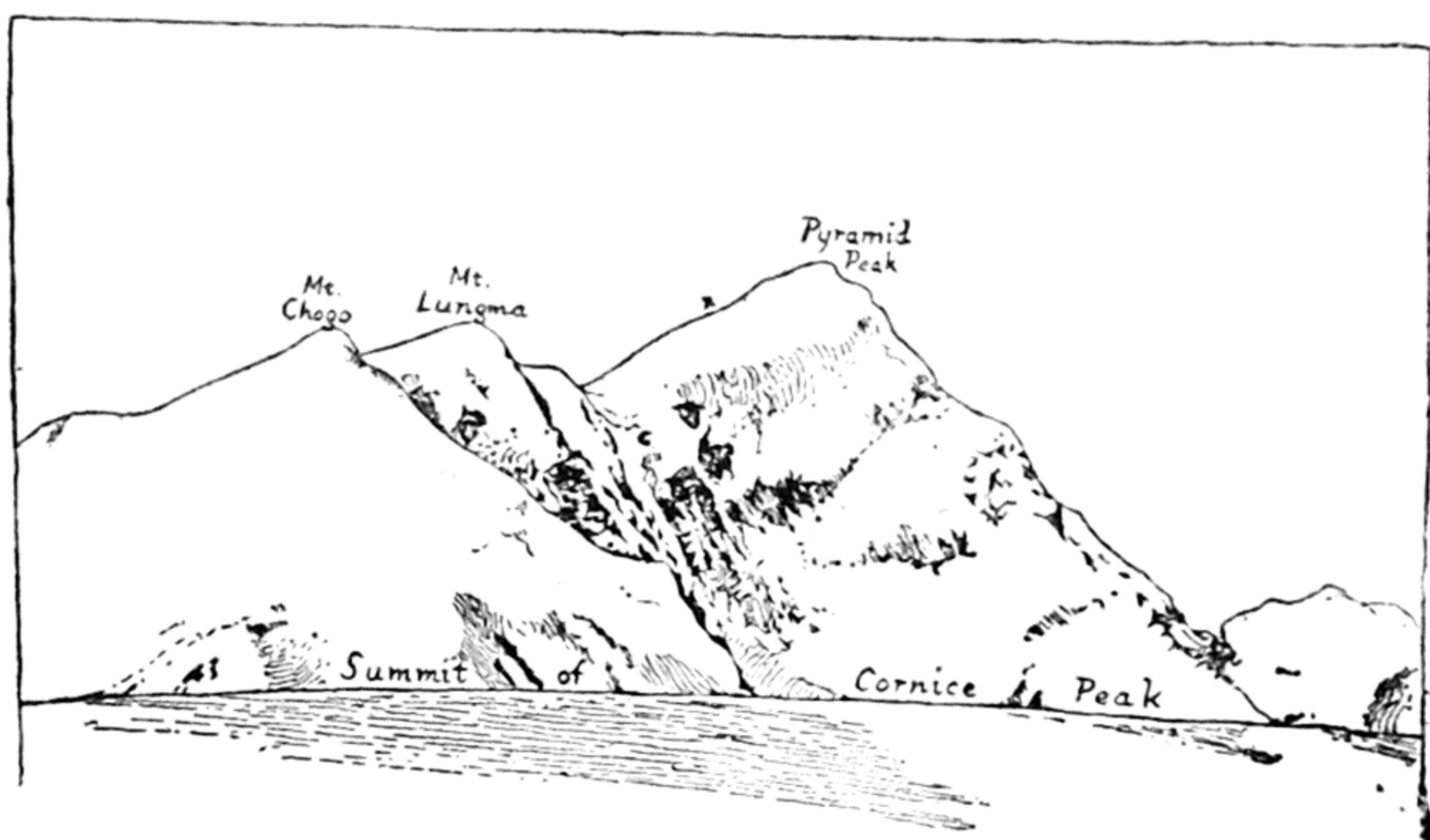
From the Riffel camp the upper reaches of the glacier wound away towards a high snow basin, upon which terribly forbidding and unclimbable precipices frowned; and to the coolies, at least, there was a clear warning not to proceed farther, in the daily clouds of snow dust and rolling thunder which betokened avalanches. Early in August the four Europeans, together with fifty-five unwilling porters, set out to find a way through the dangerous maze of cubes and towers out on to the centre of the ice. For their own protection the natives were roped together in parties; but the ground soon became so bad that they were told to stand still, while the leaders went forward to prospect. While they were all hidden from one another by the columns of blue ice, an incipient mutiny brought Dr. Workman hurrying back to the main body. An agitator had taken advantage of the opportunity to alarm them. "The howling mass of humanity, some with loads, some without, were

jumping about, gesticulating, pointing to their feet and up and down the glacier, while several, entirely beside themselves, were sprawling like frightened beetles prone upon the ice, frantically clawing it with hands and feet."

Eventually, however, they were got into a better frame of mind; the agitator was placed at the head of the column, and the march was resumed. At length they got out of the bad patch, but the day was now far spent. A bare space was found in the vicinity of another maze of tottering ice towers; and here a camp of refuge was made, the slope being so steep that everything had to be propped up with stones. This camp was 15,096 feet above the sea.

Next day they ascended a mountain almost above their camp, by an atrocious slope of soft shale, where every step forward meant a slide back. When they were right under the summit they found themselves confronted by an overhanging snow cornice; Zurbriggen cut a hole through this, and up the tunnel thus made all the party crawled. They named it Cornice Peak. It was only 17,800 feet high, but it gave them an admirable view to the north. They saw now that they were on a long narrow rib of rock, with the Chogo Lungma Glacier far below on their left, and a virtually enclosed ice basin (which they naturally named Basin

Glacier) on their right. Cornice Peak was the first and lowest of four beautiful summits. Next to it on the ridge, and seemingly very difficult of access, was Mount Chogo (21,500 feet); then, after a gap, came Mount Lungma (22,568 feet); and lastly, there rose in the rear a noble mountain, which they named Pyramid



View from Cornice Peak
X, Workman's highest

Peak (24,500 feet). It was decided to attempt all three, but persistent bad weather made this project impracticable until the succeeding year.

Sliding back down the shale to the camp, plans were made to complete the ascent of the glacier; and the party was soon involved in fresh wonderment at the marvellous awkwardness with which ice can break. Next day, taking sixteen lightly loaded coolies and a sledge, they

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trusted themselves once more to the labyrinth of hillocks, towers, and ditches; and after safely pulling the sledge up on to level ice, soon found that article to be useless, for it stuck in the snow repeatedly, and required the entire energies of the men to move it. Soon they were in a great ice basin, more than 17,000 feet high; the sun poured down upon them like the heat from an open furnace; trudging through the deep soft snow became more and more wearisome, while the hateful glare burned their hands and faces. At 3 p.m. the coolies struck work; accordingly, camp was pitched in the middle of the basin, as far as possible from the incessant avalanches.

Next day, while the coolies rested, the whites pushed on over downs of snow and along the edges of bottomless blue clefts to the head of the glacier, 19,000 feet above the sea. Finally an ice wall, scarred by ugly clefts and diversified by masses of tumbled blocks, pulled them up completely; it rose above them for 800 to 1000 feet, to a gap between high summits. At all costs they were determined to see what lay beyond the gap, but this would be possible only if they could attack the ice wall during the early hours, before the sun had rendered its surface too deadly. It was therefore necessary to go back once more, and bully or argue the coolies into bringing up a tent.

After some arguing with the men, the march was resumed. Wearily plodding along, the coolies refused to realize the danger in which their own slowness placed them, from the beautiful but dangerous cornices that festooned every peak; let one of those frail things of translucent ice fall, and what might it not start in its downward path! One particularly dangerous place had only been cleared a few moments by the last lagging man, when "we saw what seemed to be the whole mountain-side in motion. The huge curling cornice that had graced its brow and caused our fears had broken loose. Vast masses of snow and ice were sliding downwards, rolling over one another, leaping through the air and smashing themselves against the rocks, with hissings, growlings and crashings, as if all the demons of the infernal regions were venting their wrath on that wall. . . . As the mass struck the glacier it seemed to hesitate a moment, then, gathering head with a high seething front at least half a mile wide, it shot across the glacier regardless of undulations and gradients, with a roar such as might be produced by fifty railway trains running abreast at high speed, leaving in its path a chaos that must be seen to be appreciated."

They were not destined to climb the wall, after all. Camp was pitched in a fog at the

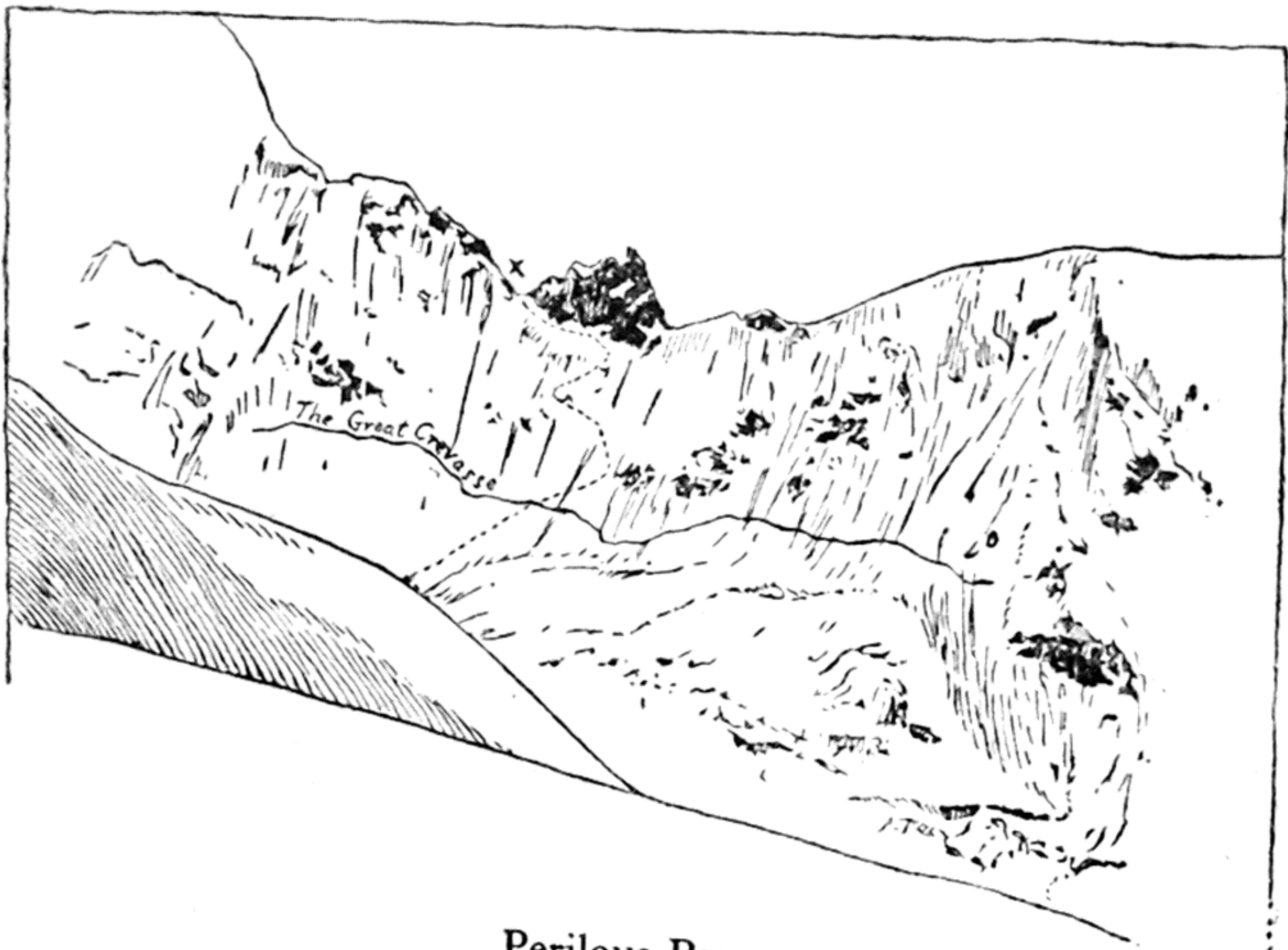
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glacier's head. Next morning the barometer fell, and to avoid being caught by a storm in that ugly place they retreated to the refuge camp, literally feeling their way through the mist. It was snowing before the tents were up, and once inside the canvas they had to stay there, while a storm of sixty hours' duration wore itself out. They were without hot food and were acutely uncomfortable; scarcely able to hear each other between the mad flapping of the tents and the howling of the gale. Afterwards they retreated to the Riffel camp.

Another piece of work from the base led to an even worse experience. The enclosed glacier—Basin Glacier—which had been seen from Cornice Peak would have to be examined before any ascent could be made of the three more distant summits. It was only 1 mile wide and $7\frac{3}{4}$ miles long, and it lay in a deep hole where it collected all the heat from the fierce noonday sun, causing acute discomfort to everybody. They fixed their tents at its head, surrounded by gaping clefts on three sides; all around were the sheer cliffs of great mountains, except at one point, where two small gaps occurred high up on a treacherous ice-glazed precipice. In order to learn more about the topography they decided to attempt the scaling of this wall, but the crevasses were so numerous and intricate

that they did not dare to start next morning without the aid of daylight.

Clambering over a wilderness of sharp blocks brought down by avalanches, and tumbling waist-high into the snow-filled hollows between them, Zurbriggen, Dr. and Mrs. Workman, and



Perilous Pass

Showing the route followed by Zurbriggen and the Workmans

the porter at length reached the edge of a great crevasse bounding the glacier on one side and the wall of the two gaps on the other. The way across was by a snow bridge of doubtful strength; once on the far side, ice rose straight before them to the gaps at an angle of 60 degrees. Fortunately this precipice was broken at one or

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two places by projecting rocks, up to which they cut their way, the leader's ice-axe ringing on the wall while the others tried to balance themselves against the keen morning wind. Two hours of this work only carried them half-way up; the last of the friendly rough patches had been passed; the nearer of the two gaps could not possibly be tried, because of the fear of snow slipping, and to make a traverse across to the other involved grave and obvious risks. For the present they were in shade; but soon the sun, wheeling overhead, would pour his burning rays upon them, and would melt the snow crust upon which they stood, and the slipping of that might kill them all. Nothing was said. The lady faced the situation calmly and resolutely; so they went on. Another hour and a half brought them up to a patch of high rocks between the two gaps. It was crumbling away; and even if it had been solid they were denied the use of it, for a crack—sometimes only a few inches wide, sometimes several feet—extended between the icy wall and the cliff. The edge by that crack was itself crumbling and frequently broke away; but along it they had to go. Meanwhile the sun began to glare down upon them, its rays coming off the rocks above like warmth from a grate. Only one person moved at a time, the guide taking every

chance of placing his axe firmly, as a precaution against a slip. Finally at 1 p.m. they reached the gap, only to find it little wider than the spider's thread along which they had just come, and with an abyss on the far side worse than the one behind them. The altitude was 19,260 feet.

A hurried bite, a drink, and they faced the still more dangerous ordeal of turning round and retreating to their green tents, which looked mere specks 2000 feet below. The sun had now done its work, and their feet sank into the snow, sometimes to the ankle; slips were not infrequent, but nobody overbalanced. In the middle of this gymnastic performance on a precipice, with the thermometer at nearly 200 degrees, the brave Zurbriggen faltered for a moment. "We cannot get down to-day," he said; thinking, of course, that after sunset the refreezing would make the thing easier. But they had to get down or die. Mrs. Workman summed up the position admirably. "No shelter of any kind was to be found on that wall. There was not a place where one could sit down to rest. We should be obliged to stand in the narrow steps on which our feet rested till we dropped from fatigue, which would mean a slide of nearly 2000 feet down the avalanche-gullied ice slope into eternity. Could we manage to stand there we should be frozen stiff in our

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tracks before morning, as the temperature would drop to zero."

Therefore they went on. The lady shall continue the story.

"Shortly after this the porter, who was second in the line, lost his footing completely, and dangled helplessly on the rope. Zurbriggen, who was last, and somewhat above, having his axe secure in a narrow crevasse and the rope round it, was able to hold firmly, while the other two, though by no means securely placed, by the aid of their axes prevented themselves from being pulled off."

The porter, thus supported, regained his feet. After this they went down more carefully than ever. When they came to the rocks which had proved of such assistance on the way up, they decided to abandon the old tracks as being too dangerous. As a rule climbers go down a cliff face outwards; but in this emergency it was necessary to turn about. They cut a way straight down to the great crevasse, faces to the wall, and gingerly treading in the porter's steps; Zurbriggen, who went last, had the fearful responsibility of holding all, should another slip occur.

The descent had now taken so long that the danger was passing. In the cooler hours of evening they reached the crevasse, and boldly

sprang off where it overhung, landing in the deep snow below. They were safe!

Soon after this exciting episode the season of 1902 ended. When Dr. and Mrs. Workman revisited the Chogo Lungma in 1903, they were favoured with a few fine days between a succession of heavy snowstorms; and advantage was taken of this rare opportunity to climb two of the three summits beyond Cornice Peak (p. 141), and to reach a great level on the third.

All three of the peaks descend to the edge of Basin Glacier in curves almost as steep as a cut through a cheese; but by clambering up a difficult wall between the first of them (Mount Chogo) and Cornice Peak, it became possible to take the summits one after the other on the same day. This necessitated getting the coolies up to a camp at 19,500 feet, itself a great achievement in those days. By her conquest of the second peak (Mount Lungma, 22,568 feet) Mrs. Workman added to her reputation, already great, and surpassed by far the altitude record of any other lady. When we consider the discomforts attending every operation at nearly $4\frac{1}{2}$ miles above the sea—the exposure to alternate baking and freezing, the impossibility of getting proper sleep, the mechanical difficulties of climbing and snow trudging, and the nerve requisite to stand on a knife-edge, with glissades down

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to eternity on both sides as the certain result of a single slip, we know not which to admire the most, her courage, her will-power, or her physical endurance. This, moreover, was not all. In a later expedition to the Nun Kun group, an isolated nest of high summits east of Srinagar, she ascended the difficult Pinnacle Peak, 23,300 feet, and thus put the seal on her fame as a mountaineer.

We must now hurry away to the south-east, to the Kumaon and Garhwal Himalaya, a region which has always had a strange fascination for the native mind. Drained by the headwaters of the sacred Ganges, the terrible defiles, with their flimsy rope bridges, atrocious mule tracks, beasts of the jungle, and densely massed trees and undergrowth, have been trodden by the feet of countless devout pilgrims. The mountains themselves, which are seen as often as not through a beautiful framework of pine needles, or round the corners of giant rhododendron trees, or from behind a mass of glorious wild roses, have a steepness and visual height not found elsewhere. Nanda Devi, the Abode of Snow, and Nanga Parbat, the Naked Mountain, have defied the best efforts of trained alpinists, not merely to climb them, but often even to reach their lower slopes. Gangotri, Trisul, Kamet, Dunagiri, and other giants are more

accessible; yet from the dawn of the nineteenth century, when Moorcroft, Fraser, and Webb penetrated these wilds, to the year 1930, the only major mountain to succumb was Trisul.

In June, 1883, a very energetic and capable young alpinist, Mr. W. W. Graham, who had gone to India in search of something really difficult to climb, paid a visit to this region. With him were two first-class guides, Emil Boss and Ulrich Kaufmann, besides M. de Décle, a French Alpine Club member, and a select band of coolies.

At first they decided to attempt Nanda Devi. The "road" was cut through gorges, down among loose rocks, over planks supported on pegs, with a torrent boiling away beneath, and through patches of dense bush where no argument but the knife could force a way; and it proved so continuously bad that de Décle gave up, exhausted. The others persevered; stumbling over the water-filled holes in the track, worn out with helping the coolies up and down cliffs, and annoyed to madness by the curse of that region, the black, thread-like leeches, they came at last to a complete halt. At this point the track ended in a precipice 500 feet high. Even the alpinists could find no way down its polished surface; and a retreat was ordered.

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They next attacked Dunagiri, a noble mountain more than 23,000 feet high; but by the time they had reached its glaciers most of the food had gone. Accordingly, the coolies were paid off, and the Europeans attempted the ascent alone. They had first to mount a ridge for several thousand feet, an exhausting process at best, but doubly so in the stifling heat; at the top Kaufmann was so weak that he had to stop, but Boss and Graham went on. Above them an ice wall rose steeply into the gathering mist; and while they were cutting steps up it (Boss leading and notching the ice, while Graham enlarged the holes), the cold wreaths came down and almost hid them from each other. When they were less than 500 feet from the top it began to hail. Every step was now more treacherous than before, and so much time had already been expended that a night up there seemed certain. Fairly and squarely beaten, they turned and crawled down again to Kaufmann, and three miserable figures, reaching the glacier again in darkness, spent a never-to-be-forgotten night there, without matches, food, or dry clothing.

After this defeat Graham made another attempt to get to Nanda Devi; but first fourteen out of his twenty coolies bolted, and then, when he had fought his way to within measurable

distance of the mountain, the rest followed suit. The track through the gorges had been even worse than their initial effort; four days of awful toil yielded but twenty miles. "In many places," said the leader, "it was only by holding on for dear life and using the rope that we could get on at all." At last they were completely stopped by a torrent, when nothing else separated them from the Nanda Devi glacier. Two efforts to bridge it with trees failed, the trunks being "whirled away like straws". Then the rest of the coolies deserted, and retreat became inevitable.

A little later, as we shall see in another place, this remarkable climber made mountaineering history.

Early in 1907 another party of optimistic alpinists gathered together in India, with the modest intention of climbing Mount Everest, to celebrate the jubilee of the Alpine Club. They included Major C. G. Bruce, who had been with Conway on the Hispar crossing, Mr. A. L. Mumm, and Dr. T. G. Longstaff, whose training for the Himalaya had (as in so many other cases) taken place in the Alps and the Caucasus.

The Indian Government has suffered from the delusion, once or twice in its history, that information of use to foreign powers might be

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disclosed by any exploration of the virtually impassable gorges of Sikkim and Nepal; and although it had (rather unwillingly) despatched the famous Younghusband Mission to Lhasa only four years before, with some slaughter and much upsetting of Tibetan mentality, such a shock to the Tibetans as an ascent of a mountain could not possibly be permitted. Therefore the Indian Government, in one of those polite but icy documents which begins "Sir" and ends "Your obedient servant", refused to allow the Longstaff party to go anywhere near Mount Everest.

Accordingly, the alpinists went to Garhwal, took a look at Nanda Devi (to which, by extreme efforts, they got very slightly nearer than Graham had done twenty-four years before), and decided to try something easier. By dint of crossing numerous ravines, the nature of which can now be understood without further superlatives, they found themselves at the bottom of the Trisuli valley, looking south at a triple-crowned snow peak, Trisul.

Although rising clear above its neighbours, this beautiful mountain presents no difficulty to an expert other than its height of 23,406 feet, but the wind—always an incalculable factor—proved a severe handicap. Bruce had been injured in getting through the gorges;

and the party which made the first attempt comprised Longstaff, Mumm, the two Brocherels (the same guides who established an altitude record with the Duke of the Abruzzi, p. 134), and Karbir, a plucky Gurkha N.C.O., who persisted in going despite a frost-bitten foot. After a trudge up easy slopes through deep snow, a camp was made on an exposed plateau at 20,000 feet. Success on the morrow seemed certain. Then the wind took a hand, coupled with a snowstorm; and after two days' imprisonment there they were glad to retire to a sheltered clump of junipers at 15,000 feet. Longstaff then determined to try to rush the peak; and early on the 12th he, together with Karbir and the two guides, successfully accomplished it. Mumm had to remain below, being unwell. This ascent surpassed Dr. Workman's best by a few feet.

Nearly fifty miles due north of Trisul, and right upon the frontier, stands the second greatest mountain in the British Empire, Kamet (25,443 feet).

After their success with Trisul the Longstaff-Mumm party determined to attempt this giant also, but it was not to be slain so easily. They had to contend with mists and storms; they had no clear perception of the local geography; and after sighting the peak and climbing up

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to a great altitude towards it (more than 20,000 feet), they found that an impassable glacier-filled gulf lay between them and the grim red precipices of Kamet. The glacier itself was narrow and was overhung by ice-fringed walls; any party venturing upon it (at least in July or later) stood every chance of extermination by an avalanche. Under these circumstances the project had to be abandoned.

Another notable attempt upon Kamet was made in 1914, by Mr. C. A. Meade. Between the great mountain and a lesser but still considerable height to the east lay a snowy gap; and here, after great efforts, Mr. Meade got up a tent and spent the night. The altitude was 23,500 feet. Next day they were unable to continue, and a splendid chance of conquering Kamet was lost.

Before the Great War Dr. A. M. Kellas, a teacher of chemistry in a London hospital school, who was deeply interested in the question of climbing high peaks and its effect upon human beings, made several important Himalayan expeditions. He then confined his attentions mainly to the Kangchenjunga country, however, producing by far the best map yet made of that region, and ascending some very high summits, including Pawhunri (23,180 feet).

After the war, the question of attempting

Mount Everest again became prominent. Providence (in the shape of official sanction) blessed the scheme, and while reconnaissances were going forward, and committees of various kinds were devising ways and means of attacking the monarch of mountains, Dr. Kellas undertook to study the effect of artificial aids on man at high levels. Although not in good health and more than fifty years old, he went to India to carry out a series of tests. Climbers were to ascend a given distance, unencumbered. They were then to repeat the performance carrying cylinders of oxygen, which they would respire on the journey. A third traverse of the same ground would be made with rubber bags containing a solution of caustic soda. Blood tests, the counting of heart beats, and other experiments were also to be made.

Dr. Kellas selected Kamet for this work. By the aid of a large body of coolies supplies were got up to its base, after which high camps were established at 21,000 and 22,000 feet. On 21st September, 1920, he and his coadjutor, Major Morshead, started from the highest camp with three coolies, intending to scale the peak from the north-east. On its southern side was a succession of enormous cliffs, with a clear drop of more than a mile and a half; but by reaching Meade's gap they hoped to find a

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fairly easy mode of conquering the remaining 2000 feet. The gap was at the top of one of those icy walls which we have already met several times, beneath which lay tumbled rocks or screes; on the ice, steps had of course to be cut, and when at last they surmounted the gap, the coolies refused to go on. Thus another promising chance of ascending Kamet came to naught.

The results of the tests were valuable, however. Kellas and Morshead stood the rare air better than their men, who were not a picked crowd. As to the oxygen apparatus, it was a complete failure. A single cylinder of gas weighed nearly 20 lb., and in every case men climbed better without it; this was the result of the weight only, however, for much lighter cylinders were a partial success in the Everest expeditions. The soda bags apparently made no difference whatever in the rate of progress.

The subsequent history of the Everest expeditions has been detailed in another volume of this series.¹ Dr. Kellas, who accompanied the first of them, suddenly died of heart failure at Kampa Dzong, *en route* for the mountain, and he was buried there, in the most appropriate setting for such an outstanding mountaineer.

After various parties had made nine fruitless attempts on Kamet, there approached it at last

¹ *True Stories of Modern Explorers*, by B. Webster Smith.

an antagonist who enjoyed, not only the benefit of the experience gained by others, but also the advantages of a new method.

Mr. F. S. Smythe, who had already acquired a high reputation as a bold climber in the Alps, and had participated in the extended Dyrenfurth attack on Kangchenjunga, now elected, during the early summer of 1931, to try Kamet. He had five white companions, Messrs. Beaudeman, Birnie, Greene, Holdsworth, and Shipton, besides the usual army of carriers. The new mode of war was to wear the enemy out. A camp was to be made as near to the Meade Gap as practicable, with a month's provisions; and the climbers were prepared to suffer all the discomforts of residing continuously up there until a favourable chance arose of scaling the peak. This was a flat defiance of the old belief that men become progressively weaker the longer they remain at a great height; as it happened, the need for a protracted stay did not arise.

At the beginning of June they ventured up the dangerous Kamet glacier, a step which might have been impossible one month later. Three camps were then established, the highest at 20,600 feet; at the latter one month's food and fuel were placed. A still higher camp was made at the foot of the Meade Gap, 22,000 feet,

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and by fixing ropes to the mountain-side, laden coolies were enabled to mount thus far.

From this point the leader, with Holdsworth, Shipton, and a native, started on 20th June, followed the track of Kellas up to the gap, but pitched their tents just beneath it. On the succeeding morning they started for the summit, which they reached in $8\frac{1}{2}$ hours, mostly wearisome plodding through deep soft snow. Towards the top, where steps had to be cut in ice, the angle grew steeper, and the rate of progress dropped to 100 feet per hour. Despite the physical obstacles and the bitter cold, Smythe managed to get his cinematograph camera up to the very summit, thus obtaining a unique record of the climb. They descended safely, but were much hampered by cold, most of them being frost-bitten. Two days later Birnie and Dr. Greene also completed the ascent. Thus was Kamet vanquished after a siege of nearly thirty years.

CHAPTER VI

In the Heart of the New Zealand Alps

On 2nd January, 1931, there died at Cirencester Major Edward A. FitzGerald, whose name will ever be remembered in mountaineering annals as the man who first crossed the New Zealand Alps, and leader of the successful attack on Aconcagua, South America's highest point.

The extraordinarily rough country which forms the backbone of South Island, N.Z., towers like a saw on edge between the fertile plains and sheep runs of the east and the gold- and coal-mining centres of the west coasts. The few routes across it traverse rugged gorges, while for more than 100 miles there was, prior to 1895, no known means of crossing whatever. The mountains, although few of them much exceed 10,000 feet in height, have a visual height of 7000 to 8000 feet above their glaciers. The latter either tumble down in vast and magnificent frozen cascades, like the Hochstetter or the Franz Josef Glaciers, or gently decline down broad trenches into a savage and

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abandoned wilderness, like the Tasman. What makes both mountains and ice different from almost all other highlands, however, is the vegetation. The frozen snouts of the ice sink between walls of sub-tropical undergrowth, incredibly difficult to pass, and diversified by stands of tree ferns; the call of the unseen kiwi echoes across the lonely glens; and the scene recalls the higher parts of Switzerland, set in a patch of the warm Pacific islands.

This paradise of beautiful scenery and climbing possibilities was first roughly explored in 1861; but the colonists made little use of it, and even in FitzGerald's day, thirty-four years later, most of the summits were believed to be unclimbable. To open up the country, the Governor of the colony invited the Alpine Club to send out a trained mountaineer, and in 1882 the Rev. W. S. Green accepted this invitation.

The most interesting part of the island, from an alpinist's point of view, is the 100-mile stretch that shows no pass. In the middle of this stretch, and about three to four miles from the mountain wall, there runs a long straight glacier, the Tasman. Just below its southern end a house, known as the Hermitage Hotel, lies in a side valley; six miles farther up, at the junction of a steeply dropping glacier from the west, is Ball Point, where Green made a camp.

Three miles west of the Hermitage, towering straight above it, a veritable Matterhorn for difficulty, is Mount Sefton (10,359 feet); while at the same distance west of the Ball Point Camp stands the noble three-peaked mass of Mount Cook (12,349 feet), the highest point in the island. From the northern edge of Mount Cook a series of mountains rise, the Silberhorn, Mount Tasman, Mount Haidinger, and many others, mostly 10,000 feet high, and nearly all virgin peaks at that time.

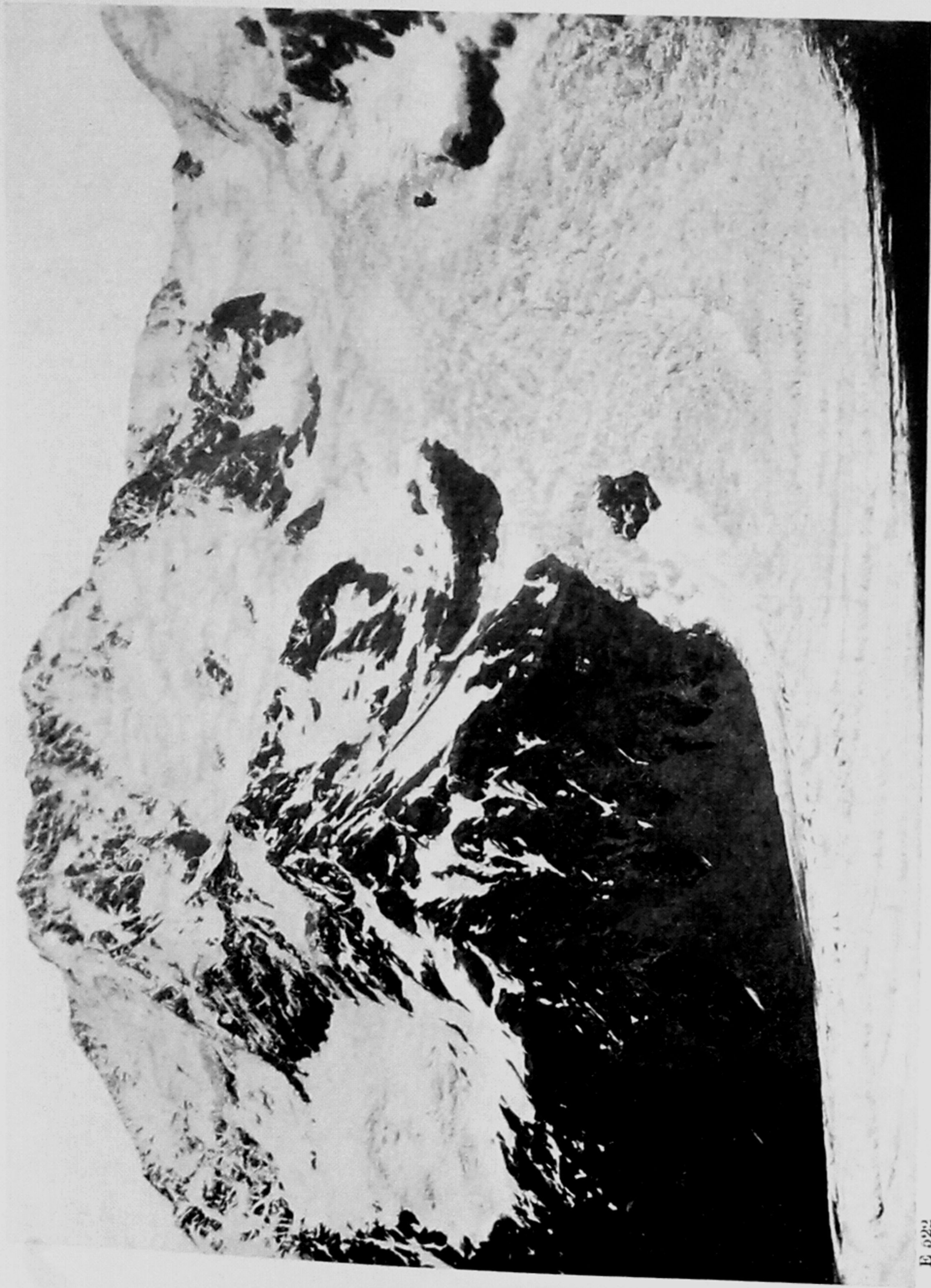
Mr. Green did a great deal of preliminary spade work. He explored the Tasman and other glaciers east of Mount Cook, and in a long and tiresome climb up that peak reached within a few feet of the summit; the onset of night, cold and shortage of supplies forced him to relinquish the capture when it was almost within his grasp. His journey inspired the New Zealanders with an interest in their peaks, both for their own exercise and as attractions for tourists. The New Zealand Alpine Club came into existence; but its members naturally lacked the experience of men who had climbed up the Swiss precipices, and at first they did not make much headway. They were also handicapped by a feature peculiar to the country. Mountain climates are always variable; that of New Zealand is particularly bad, the constant north-

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west winds being dreaded by all who have anything to do with the mountains.

At this stage FitzGerald appeared on the scene. He was then a young man of twenty-three. He had just accompanied Conway's famous "Alps from End to End" tour; and at the end of the season had formed the idea of wintering in New Zealand, climbing Mount Cook, and looking for a practicable passage across the mountain wall, up which a mule road could be built. He had already displayed both excellent climbing skill and (what is often more important) an ability to organize an expedition, and to work out all the multitudinous details which must be decided before one even sights the snows. He took Mattias Zurbriggen with him as guide, and these two did most of the actual climbing; they were accompanied by Mr. C. L. Barrow, a friend of FitzGerald's. After a somewhat chequered passage they reached the colony just before Christmas (i.e. midsummer), 1894.

The first part of their plans had to go by the board; for Mount Cook was at this very time climbed by three New Zealanders. The second and more difficult part remained. FitzGerald proposed to achieve it by ascending as many high points on the wall as he could, and surveying the rest from those convenient eyries.



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Photo. New Zealand Government Publicity Department

MOUNT COOK AND HOCHSTETTER GLACIER

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All their equipment had to be taken from England, and it proved no easy matter to get it to the mountains. There was a railway to Fairlie Creek; but beyond that point ninety miles of rough upland roads had to be traversed, rivers crossed at fords or by a carrier rope, and bogs negotiated; all this in a country in which the farms were at great distances from one another, the rivers often impassable, and the only transport available an ancient wagon that broke down repeatedly, and some young pack-horses which took fright in the streams. Four days were required to convey their goods to the Hermitage, their trail being marked by a succession of abandoned bags and cases; and when they did reach the house, they found that it was closed, the owners having become bankrupt. While relays of horses were sent back to pick up the missing articles, the party slept in tents; and a cow belonging to the Hermitage became on very friendly terms with them, eating up their provisions and commencing with the soap.

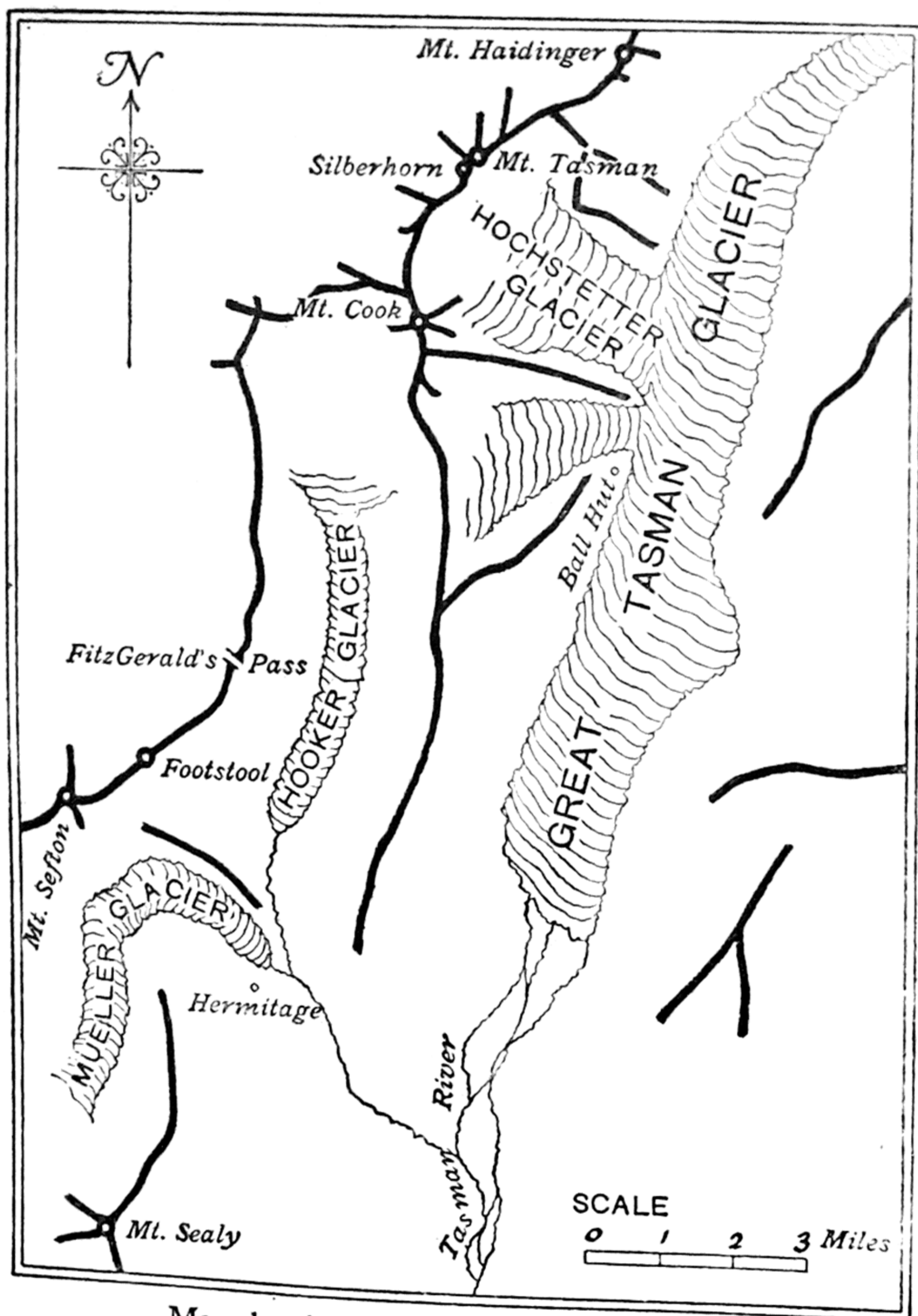
The naked precipices of Mount Sefton fascinated them all. Both the guide and Fitzgerald, however, were convinced from the start that it could be scaled only with every advantage in their favour; but such advantages were long in appearing. They paved the way by a recon-

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naissance on 11th January, 1895, when, with three New Zealand tourists, they crossed the much-cracked Mueller Glacier beside them, and ascended a ridge towards Sefton, intending to establish a camp. Eventually a bivouac was made 3000 feet above the Hermitage. It was on the bare mountain slope, overhung by a gigantic boulder, and as rain was pouring at the time its shelter seemed very friendly. They were destined to have quite other thoughts about that bivouac before long.

Here the night was spent without sleeping-bags, on a floor which had been only roughly levelled up. The rain pattered down incessantly; and when morning came there was nothing to be seen but the grey mist overhead and the slippery wet grass beneath; so they all descended again, and the Sefton project was laid aside for the moment.

A few days later, accompanied by a young camp hand named Clark and a holiday-maker, Mr. Ollivier, the three travellers made their way up the straight Tasman Glacier six miles to Ball Point. On the side of Green's old camp the Government had built a corrugated iron hut; they took possession of this, and made it their head-quarters for climbs in the Mount Cook-Tasman part of the range. The outside of the hut had other tenants. A crowd of kea



Map showing area explored by FitzGerald

parrots occupied it; they kept the travellers awake at night "by walking up and down the

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iron roof, and, to judge from the sounds, tobogganning down and falling off at the edge with shrieks of terror and rage”.

A tremendous and indescribably confused mass of ice blocks, the Hochstetter Ice-fall, descends for a vertical distance of nearly a mile quite close to the Ball Hut. On its far side a ridge rises to a high snowy plain known as Glacier Dome; and beyond the Dome lie Mounts Cook and Tasman, with the Silberhorn between.

On the morning of the 15th the entire party started up this ridge to make a base camp whence Mount Tasman might be assailed. The weather seemed magnificent, yet before they had half completed the ascent the wind had gone over to the north-west, clouds had scurried up, and rain was falling as it falls only in the New Zealand mountains. They continued to climb the ridge nevertheless; but it was not until 5 p.m. that they found a site for a camp, and even then it had to be carefully levelled lest the tent and its occupants should be hurled to the glacier 3000 feet beneath. At this place they spent a terrible night, listening to the pistol shots of the canvas as the wind tugged it this way and that, shivering in the cold, and trying to mop up the rain from the tent floor; when morning came the storm had ceased, but

the tent was frozen so hard that they could scarcely get out.

Zurbriggen having found a way across the ice of Glacier Dome, it was decided to attempt Mount Tasman by way of the Silberhorn, whence a long ridge ran down to the glacier. Clark having taken up more supplies, they all started off at 2.30 in the morning, and by 5.30 were able to reach the base of this ridge. Cumulative difficulties then rushed down upon them. There were places where huge towers and crevasses barred the way; and to get round the one and over the other involved much step-cutting in the frozen walls. Then the weather changed. The wind went round to the dreaded quarter; and very soon icy gusts whipped round the edge so furiously that they often had to stop and hold on for dear life. Next a mist, which had been brought up by the wind, blotted out the summit above them, and throwing down great curls and streamers, made it impossible to see from one end of the rope to the other. Snow began to fall. To crown all, they tried to save time by leaving the ridge for the glassy face of the peak, with the idea that this would bring them on to Mount Tasman direct; this manœuvre soon landed them in such a plight that it was impossible to move without the greatest danger of everybody being hurled down the

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mountain-side. The tail then took the lead in the reverse direction, but the tail, unhappily, was not the most experienced part. "Zurbriggen was very uneasy," wrote FitzGerald, who was last but one. "I could hear him muttering to himself behind me, as he planted his ice-axe in as deeply as he could at each step; he warned me to be ready to hold up should a slip occur."

Regaining the ridge at last, they resumed the monotonous chipping out of steps up it; but the fog, wind and cold soon forced another halt. "All our things were frozen tight," said the leader, "and I could see great icicles hanging from Zurbriggen's beard."

To attack Mount Tasman now was out of the question. Ollivier, the guest of the party, was asked whether he preferred to continue the ascent of the Silberhorn or to retreat; he voted for the latter. Accordingly, they turned about, scarcely able to see each other, while the wind howled victoriously behind and around them; the gusts were sometimes so fierce that only ice-axes driven in to the hilt formed an adequate support against them. On reaching Glacier Dome they passed into the region of rain; here again the wind was extraordinarily violent, and it even blew them down. Pausing at the bivouac only to stow away the tent, they scrambled

and rolled down to the Ball Hut, where a steaming supper made amends for three very hard days on the ice. Shortly afterwards Ollivier returned to Christchurch, and the visitors were then alone so far as climbing was concerned.

They returned to the Hermitage again, and on 23rd January they made another attempt on Mount Sefton. It was arranged that Barrow, who remained below, should fire two shots at 8 p.m. if the barometer indicated good weather. Standing on the mountain-side in the cold evening breeze, FitzGerald saw two flashes far below. This was the agreed sign; so he went up to the bivouac, where he and Zurbriggen spent another miserable night, having no cover but a mackintosh square.

At 2 a.m. they rose and tried to start, but the wind kept blowing their lantern out, and they were forced to stay there till dawn. When the blessed light did come there was an ominous warmth; the day was therefore devoted to a reconnaissance among the deep snow on the glacier above.

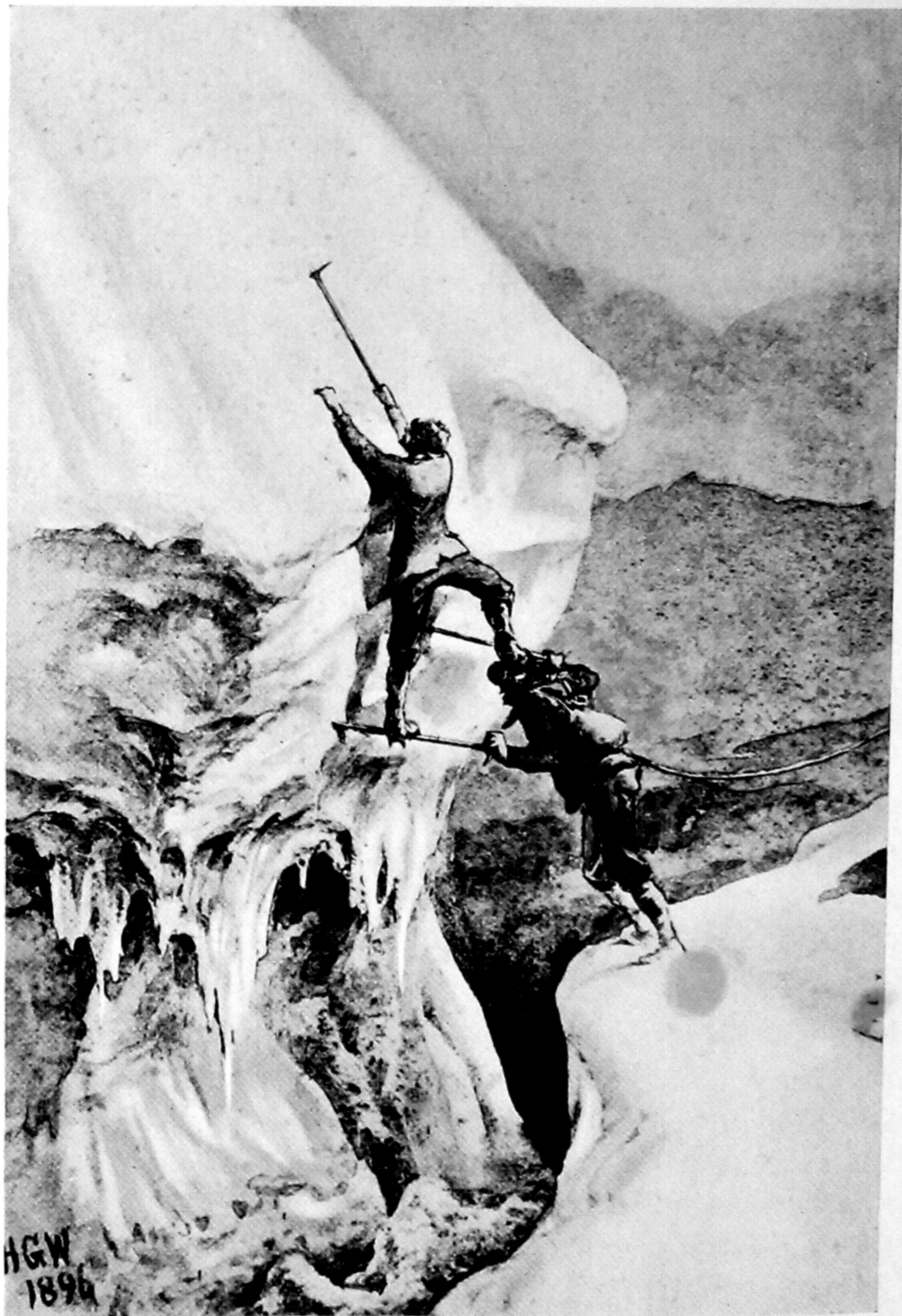
During this exploration they noticed a fine peak, Mount Sealy, which seemed as if waiting for someone to ascend it. It had defied the best efforts of New Zealand climbers; and since Sefton proved so obdurate, they determined to try for the lesser game.

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They sent back to the Hermitage, arranged for Barrow and Clark to accompany them, and successfully climbed Mount Sealy next day. From that high vantage-point they saw with astonishment the vast extent of summits and glaciers in the Southern Alps. No sign of a pass across the range could be detected.

After this success they made a third attempt to get to Mount Sefton. The mountain itself resembled the Matterhorn in several respects. Its upper part offered very severe rock climbing, which would involve hours of nerve-racking labour, and to provide for that it was essential to get high on its slopes soon after daylight. They had not the means for making high camps, and this it was which reduced them to so many fruitless devices to overcome the bitter night hours.

On the present occasion they persisted in sleeping (or rather in resting, for sleep at that spot seemed out of the question) at the bivouac; once again they found themselves there without sleeping bags or hot food, a capital mistake. The signal was favourable. FitzGerald found, however, that he could scarcely stand in the icy wind; while under the boulder it proved to be so cold that he and Zurbriggen sat up talking and smoking by the light of the lantern, until at last the wind, as if angered at this



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THE ASCENT OF MOUNT HAIDINGER

Zurbriggen, with his ice-axes pushed into the ice-wall, is forming
a ladder for FitzGerald

By permission of Messrs. T. Fisher Unwin Ltd.

(Chapter VI)

contempt of its power, blew out the light. Efforts to rekindle it failed repeatedly, and as they could not start without it, or get to the base of Sefton without starting in the dark, this attack came to naught.

Life in the camp below was not without its humour. They tried to make bread from flour, water, and a white substance which they thought was baking powder; the latter was really carbonate of soda, and no matter how it was mixed, the bread came out as hard as bricks! This puzzled them for a long time. Their stock items of food were sheep, one of which they purchased whenever needed, and porridge.

On 29th January, as the weather looked promising, they made a fresh start for Mount Sefton. In order to avoid an uncomfortable night, they decided to climb continuously, using lanterns. They left the Hermitage at 10 p.m., and although repeatedly hemmed in by the crevasses of the Mueller Glacier (which looked very formidable in the feeble rays), they got across safely, and began climbing up towards the bivouac. Their old enemy, the wind, now took a hand, and after blowing Zurbriggen's hat away, put out both lanterns. When they reached the bivouac, at about 1.30 in the morning, it was pitch dark, and while they were arguing about

the prospect rain commenced, while the wind, increasing to a gale, drove showers of wet in upon them. "We tried to keep ourselves as dry and warm as possible by covering ourselves up with our mackintosh sheeting, but the wind found its way underneath this and inflated it like a balloon, till at last it burst with a loud report and was torn into shreds, so that we were left without any covering whatever."

But they were not lacking in persistence. At daybreak Zurbriggen went down to bring up Clark with the tent, sleeping bags, and two or three days' food, as it was now realized that the mountain must be besieged in proper form. As soon as he had gone it began to snow, and when, many after hours, Clark appeared and announced that it was snowing at the Hermitage, it was obvious that the attack must be deferred once more. The tent and bags were stowed away beneath some rocks, and both men descended to the house.

To while away the time of waiting, they moved back to the Ball Hut again; whence, accompanied by the willing Clark, they set out for Mount Tasman as soon as the weather cleared. On this occasion fortune favoured them at last; for the first time the second highest mountain in the colony was scaled. During the latter stages of the climb, however, the weather

played its usual tricks; thus, when they reached the summit, nothing could be seen but walls of mist. If any pass across the range were visible from this point, a sight of it was denied to them.

The return afforded at least one thrill. FitzGerald, who was leading, decided not to trust himself to a snow bridge across a crevasse, but to jump over. He sprang, but was pulled up by the rope when in mid-air, and he crashed down on the centre of the bridge. It gave way, carrying him down out of sight; but fortunately Zurbriggen heard his warning call, and the rope held. After an uncomfortable time of dangling in the crevasse, FitzGerald managed to clamber out again.

They spent the night at their tent above the Hochstetter Ice-fall, Zurbriggen and Clark descending to the Ball Hut next day. The day proved to be misty, and FitzGerald, who had been rambling on the slopes near the tent, lost his way, and got back to the canvas only with great difficulty. Meanwhile the storm wind was moaning anew. To descend in the mist was out of the question, and he was compelled to endure a fearful night up there alone, wondering every moment whether his frail shelter would be wrenched from its hold, with himself inside, and hurled down half a mile to the terrible ice. Once the gusts became so furious that he had

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to crawl out and fix fresh ropes; meanwhile showers of stones from the mountain-side rattled on the top of his rock shelter like small artillery, and bouncing off again, jumped clear down to the glacier beneath.

Mount Haidinger (10,100 feet) is another prominent summit on the backbone of the N.Z. Alps, a few miles north of Tasman. During this trip to the district it was ascended by FitzGerald and Zurbriggen; but although the weather proved good, no sign could they find of any gap across the range which would be practicable for mules.

The season was now drawing in. If Mount Sefton were to be conquered at all it must be conquered quickly. They therefore went back to the Hermitage for the last time. On 12th February they started up for the bivouac at night, only to turn back anew through an onset of bad weather, and to their intense annoyance the next day proved glorious. The same afternoon they decided to fix themselves in the bivouac, and to remain there until the weather did improve; having the tent and sleeping bags, they were now comfortable for the first time.

The 14th February broke ominously, but they were not to be cheated any more. Roping themselves together, and taking a spare coil for

use in the descent, besides iron staples to fix in the rocks, they set out to slay the Sefton bogey.

The east and south-east faces of the mountain descend in sheer precipices to a large glacier, the Huddleston, and the end of this tumbles down precipitously to the Mueller Glacier snout, opposite the Hermitage. North of the peak is a curiously shaped lesser mountain, known as The Footstool, and between this and the eastern face of Sefton is a high gap, named by Fitzgerald Tuckett's Saddle. They intended to climb the mountain from that gap, but unless they reached it by 8 a.m., there would not be sufficient time to deal with all the many obvious difficulties above it.

The bivouac was on one of the ridges descending from the Huddleston ice to the Mueller. As they clambered up they saw on their left great rocks and snow masses tumbling repeatedly from the top to the Mueller ice 8000 feet below, "while the crags around . . . re-echoed to the roar like the vaults of some vast cathedral".

They found the Huddleston Glacier in a very bad state, it being crowded with tottering ice towers (under the quaking walls of which they had to crawl), and cracked in all directions. After safely threading a way through this maze, they reached the rocks under the Footstool, and

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then worked south towards Sefton, so as to get beneath Tuckett's Saddle. From that gap a mass of shattered cubes of ice tumbled down like the spillings of a giant sugar-bag; but with great skill Zurbriggen led the way up, until a chasm 200 feet wide defeated even him. They followed its edge to where a ridge of shattered rocks led upwards, but before they could gain the ridge they had to descend the ice wall and scale the far side, meanwhile being exposed to showers of stones from above. Here again fortune favoured them, and they got astride the ridge unhurt.

But a fresh difficulty now appeared. The rocks of Mount Sefton are particularly liable to fall to pieces through the ruinous work of frost; a clumsy kick might dislodge a minor avalanche, and the climbers had the dreadful feeling that no grip was certain, no foothold sure. As Zurbriggen was almost vertically above his companion, too, FitzGerald came in for a hail of stones which no amount of care could avoid loosening. Yet they were not to be denied. At last they got off the hateful place, and 6.30 a.m. found them upon the coveted Saddle. Whether it was practicable to continue was a moot point; for if the bulging precipice above were as rotten as the ridge below, then the venture would be perilous to the last degree.

Meantime, watchers at the Hermitage far below noted their progress, not without anxiety. The Saddle itself proved a mere edge, tormented by all the winds that blow; on the far side it dropped sheer for a mile, even outbulging in places, and all that face was so crumbling that fragments constantly fell away to the glacier beneath.

After a light meal, they attacked the grave problem ahead. Almost immediately they found themselves on treacherous loose rocks; so that FitzGerald, who was still in the rear, "could feel the whole mass tremble as Zurbriggen stepped along it". Even great blocks that could have crushed them to death were just as liable to fall off. "We were soon," said the rear man, "climbing cautiously up an almost vertical face of loose rock, clinging to it like flies, and trying each stone carefully with our hands before trusting our weight upon it."

An hour of this nerve-racking performance brought them to a slighter gradient, and then came the worst place of all.

It gave rise to a hair-raising accident, which had best be told in the participant's own words.

"We had now to climb about 300 feet of almost perpendicular cliff," says FitzGerald, who was carrying both ice-axes, so that Zurbriggen might test each rock with his hands

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before trusting his weight to it. Suddenly, as the second man was overcoming a steep place, a large boulder that he touched gave way with a crash and fell, striking him in the chest.

“ I had been just on the point of passing up the two ice-axes to Zurbriggen, that he might place them in a cleft of rock a little higher up, and thus leave me both hands free for my climb. He was in the act of stooping and stretching out his arm to take them from my uplifted left hand, the slack rope between us lying coiled at his feet. . . . The falling boulder hurled me down head foremost and I fell about eight feet, turning a complete somersault in the air. Suddenly I felt the rope jerk, and I struck against the side of the mountain with great force. I feared I should be stunned and drop the two ice-axes, and I knew that on these our lives depended. Without them we should never have succeeded in getting down the glacier through all the intricate ice-fall. After the rope had jerked me up I felt it again slip and give way, and I came down slowly for a couple of yards. I took this to mean that Zurbriggen was being wrenched from his foothold.”

The rope then stopped, however, and held him swinging in mid-air.

“ Zurbriggen's first words were, ‘ Are you very much hurt?’ I answered, No ” (for the

boulder had fortunately only struck him a glancing blow, although it made a cut in his side that bled a good deal), "and again I asked him whether he was firmly placed. 'No,' he replied. 'I am very badly situated here. Turn round as soon as you can. I cannot hold you much longer.' I gave a kick at the rocks with one foot, and with great exertion managed to swing myself round. Luckily there was a ledge near me, and so, getting some handhold, I was soon able to ease the strain on the rope."

He was only just in time, for two of its three strands had already been sawn through by the friction. He hung on to the ice-axes throughout. When he reached Zurbriggen they climbed up to a safer spot, and sat there, overcome by the dreadfulness of their recent plight, and unable to move for half an hour. Zurbriggen told him that as he fell he seized the coil of rope, luckily at the right end. "He told me that had I been unable to turn and grasp the rock he must inevitably have been dragged from his foothold, as the ledge upon which he stood was literally crumbling away beneath his feet."

Despite this accident, they went on, reached a dangerous place where loose snow hid ice, and slowly neared the summit. Sefton proved obstinate to the end. The topmost rocks were scaled only when the amateur climbed upon

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Zurbriggen's shoulder and hauled himself up by a ledge fifteen feet above; then, with the aid of the rope, he pulled up the guide. The instant that they reached the summit, the tenant of the Hermitage rode off at once to the nearest telegraph office, over ninety miles of rough country and swift streams, "so that the news reached Christchurch next morning at eleven".

They now at last saw what FitzGerald most desired, an easy pass from the lower part of a glacier to the Copland River; thence a road might be laid down to the west coast.

The successful climbers built a large stone cairn on the summit, where its presence convinced even the sceptical farmers below that the "impregnable" cliffs of Sefton had been scaled at last. Then they commenced the very difficult and dangerous work of descending, in which the spare rope proved invaluable; fortunately they escaped further accidents, although at many places their hearts were in their mouths. Late that night, after twenty-two hours' continual effort, FitzGerald staggered into the Hermitage, utterly exhausted but triumphant.

The gap through the range which had been sighted from Mount Sefton proved quite easy to cross, and the difficulties of making a road up to it were not great. FitzGerald and Zurbriggen not only went over it, but followed the

Copland Valley down to the coast; it had appeared but an easy day's walk from the summit, but it took them three days and nearly cost them their lives as well. That, however, is not a mountaineering story! The gap is known to this day as FitzGerald's Pass.

CHAPTER VII

On the Highest of the Andes

Mr. Edward Whymper, who commenced his acquaintance with mountains by sketching them, proceeded to climb them and concluded by studying them. He became greatly interested in the nature of the animals and plants at high levels, and also in the effects of diminished air pressure on the human subject; and these studies led him to the Ecuadorian Andes at the close of 1879, accompanied by Jean Antoine Carrel (his whilom guide on the Matterhorn) and a brother of the latter, Louis Carrel. These three men, supported by an occasional volunteer from the country (usually an Englishman) and an ever-changing and wholly undependable body of carriers, climbed the eight principal Andean peaks there; the giant Chimborazo, nearly 21,000 feet high, was ascended twice. Hardly any of these peaks had been scaled before; for although the technical difficulties are rarely very great, the rare air, the cold, and the impossibility of untrained men sur-

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mounting glaciers, drew a sharp line at 15,000 to 16,000 feet, beyond which hardly a soul had ventured. We shall only have space for the first ascent of Chimborazo and the night which the little party spent on the summit of the terrible volcano Cotopaxi; but these will suffice to give some idea of mountaineering in that region.

The western chain of the Andes forms an uninterrupted line more than 4000 miles long, from Colombia to Southern Chile, for the most part between three and four miles high, and everywhere within fifty to eighty miles of the Pacific Ocean. Although the higher summits are said to afford a fine spectacle when viewed from the deck of a passing steamer, such has not been my experience; for all that I could see was the luxuriant forested belt near Guayaquil and the monotonous line of low coastal mountains, absolutely bereft of vegetation, which runs from Payta, in northern Peru, almost to Valparaiso, in central Chile. Whymper was not more successful; as a fact, he was nearly a fortnight in Ecuador before he glimpsed the peak upon which he was supposed to be standing! Such contradictions probably arise through the mountains having been viewed from far out at sea, whereas I, at least, travelled close inshore.

Chimborazo is an extinct volcano almost four

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miles high. Before 1880 it was generally supposed to rise straight from the sea, but Whymper exploded that notion by ascending the coastal Andes for three days to a pass more than 10,000 feet high, after which he found the Chimborazo *Range* on the inland side of the deep Chimbo valley. The path to the interior, the so-called Royal Road, proved to be excessively bad. "If pools accumulated, there they remained. Animals dying *en route* were left to rot and were not removed." The intervening years have not made the Latin-American races kinder to their transport animals. I myself in 1922 saw a dead donkey on the high road from Lima to Callao, which had been reduced to a skeleton, but was still lying grotesquely, half upright against a wall, just as it had died!

Whymper had other distasteful things to deal with, besides the roads. Everything was wet, clammy and buried in mist. The so-called inns or *tambos* were so full of fleas that they drove him into the open air; while the village belles indulged in the filthy habit of picking vermin out of each other's hair *and eating them!* After crossing the pass the weather became dry and cold, and the country almost a desert; but the people remained unchanged.

The three mountaineers, with their cumbrous

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baggage, established themselves at Guaranda, a village overshadowed by Chimborazo; but for several days the giant obstinately refused to show himself. Then the haze cleared, and they beheld an immense, majestic cone with two heads, streaming with ice and rocked by the incessant roar of avalanches. A single scrutiny showed that these avalanches, which frequently tumbled down from cliffy glacier ends over precipices of lava, made an ascent on the east and south impossible; but round towards the west three sandy valleys headed in the peak. One or other of these had been followed by Humboldt in 1802 and by Boussingault in 1831, when those celebrated travellers tried to ascend Chimborazo; but neither of them was a mountaineer, and both stopped when the ice difficulties commenced, i.e. at about 16,000 feet.

Whymper's intention was to make a long stay on the mountain. He had deliberately chosen this region because it offered a unique collection of volcanoes, up which one could clamber without much exertion; and he purposed placing camps at different levels, and noticing the effect of the rare air on himself and his companions. The natives of Guaranda ascribed other motives to him, however. Like Ecuadorians everywhere else, they believed that the former inhabitants the Incas, had buried

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rich treasures of gold, and where more likely than on the snow-girdled summits, which their degenerate successors feared to ascend? Naturally, therefore, the Englishman had come to seek gold, and when some of his followers, from a safe distance, saw him wrapping up lumps of lava in paper, this suspicion became a certainty! Another of his habits was ascribed to idle curiosity, or perhaps even to madness. He employed local boys to find for him anything which grew or crawled about at the higher places, and his rapidly augmenting collections were a constant source of wonder and amusement. To think that a man should come so far to acquire what was (to the natives) so very common!

In order to be quite sure of his altitudes, Whymper had a whole battery of aneroid barometers, besides two mercurial barometers. The latter were treated with great care; one of them, which survived all the trials of the many ascents, was carried by Jean Antoine Carrel, and was regarded by him as so precious that it was nicknamed his Baby. The mercurial barometers were very accurate, the others quite unreliable. A check series of observations was made throughout the expedition by an English friend at Guayaquil.

As soon as the peak had been sighted the

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Carrels were sent up the south-west valleys to reconnoitre. They returned with a favourable report; and on Boxing Day, 1879, the whole expedition, with three muleteers and some Indian carriers, started out from the little town. Camp was pitched at a height of only 14,000 feet, i.e. only 4000 feet above Guaranda; but even this proved too much for the steadiness of the Indians, who bolted during the night. Next day the rest of the party established a higher camp at 16,450 feet, being forced to relay the many cases up to that point. During this work a mule broke loose from Whymper and ran off, with its master in hot pursuit. "It was handicapped," he said, "for it had a long halter which trailed along the sandy plain, whilst I ran unimpeded and gained on it at every stride. When I seized the halter, it was I who was captured. The wretched beast dragged me unmercifully over the sandy soil until Louis came to my assistance, and we towed it back in triumph to the camp."

This sandy waste, which formed all the lower slope, yielded to the feet, and to plod through it at that height was most exhausting; but with some difficulty they got mules up even to the second camp, a spot sheltered by the end of an old lava stream, and with snow available for drinking-water.

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The three Europeans, who had never been higher than to the top of Mount Blanc before, were suddenly stricken with the complaint that Whymper was investigating. Whymper noted the symptoms—violent headaches, feverish temperature, and gasping—with the enjoyment of the physician studying a new disease, coupled with the irritation of the patient who was suffering from it. After a day or two the symptoms subsided, nor did they recur during the expedition, the only effect of higher altitudes being the usual lassitude and extreme slowness of every movement.

A ridge rose above the camp for some 500 feet, probably an old lava flow; its loose surface and sandy patches offered no other difficulty than the toil of standing upright in the soft stuff. Higher up, however, the gradient was much sharper, and marked by jagged blocks. A third camp was made up here, in a spot exposed to the strong wind, 17,285 feet above the sea, and with the aid of the muleteers three weeks' provisions were got up to this place.

At 5.30 a.m. on 3rd January they left this high camp for the summit, clambering over the sharp, knotted black surface, and stepping over the interminable holes between the blocks, until they came to the base of a cliff where real

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climbing commenced; above this was a snow slope, above that an ice precipice, and then the summit dome over all. At some places loose fragments were treacherously held in by a thin film of ice, and here steps had to be cut. A search along the base of the lower precipice revealed a "chimney" or breach in it, the angle of which was more than 50 degrees; down this chute slid small snow avalanches from time to time. The Carrels cut steps up the chimney; "then all at once we were brought to a halt". The wind, enemy of every climber, began to assert itself in no uncertain manner, and they hurried down to the shelter of their tent.

The following morning they tried afresh. The chimney was surmounted by 8 a.m., and as they mounted in zigzags, so as to lessen the fatigue, the prospects seemed bright. At places steps had to be cut here; the effect of the great height showed itself in Carrel's paces, which "got shorter and shorter, until at last the toe of one step almost touched the heel of the next".

At about 10 a.m. they passed the highest exposed rocks; an hour later, above the clouds, they thought they could see the Pacific. The summits rose above them, one on either side; it seemed as if another hour would finish the job. But now the sky became overclouded, the

wind began to howl again, and they tackled a far worse enemy than either, in the shape of a deep soft snowcap. "The leading man went in up to his neck, almost out of sight, and had to be hauled out by those behind." A traverse in the biting blasts revealed the unpleasant fact that both summits were entirely surrounded by this "quicksand" of wet snow, the bottom of which could not be reached with a twelve-foot pole.

The only way to get on at all was to beat down the snow until it would bear their weight; then to crawl forward on hands and knees and beat down another patch, and so on; "and even then one or another was frequently submerged and almost disappeared". Three hours of this heartbreaking labour only halved the distance between them and the summit; and at last Whymper hesitated whether to go on. "Jean Antoine replied, 'When you tell us to turn we will go back; until then we will go on.' I said, 'Go on,' although by no means feeling sure that it would not be best to say 'Go back'." Ninety minutes later they reached the base of the last slope, and at 3.45 p.m.—hours after they had expected to arrive there—they stood on the summit. But honour was not satisfied even now, for it turned out to be the lower summit! So back they went to the beating and

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floundering, and were at last rewarded by the crest of the other summit, although they were worn out, angry and wet. Their mercurial barometer, which had survived all mishaps, registered 20,545 feet, or nearly a thousand feet less than previous estimates.

This done, they fled for their lives. It was easier to roll down in the snow than to force a way up through it; and they had the additional incentive that if they failed to reach the chimney they would assuredly be frozen during the night. "We gained it," says Whymper, "just as daylight was finishing, and night fell before it was left behind us, a night so dark that we could neither see our feet nor tell, except by touch, whether we were on rock or snow." But fortune favours the bold, and they reached the camp safely.

A few days later Whymper desired to repeat the ascent, but J. A. Carrel refused to go. It transpired that his brother had been seriously frost-bitten, largely through his own negligence, and there was nothing for it but to break up camp and descend to lower levels.

During Louis Carrel's convalescence the elder guide and Whymper were reduced to improving their knowledge of Ecuadorian geography, and to the collecting already mentioned. Subsequently the eight other ascents of volcanoes in

this region were made. By far the most interesting of these was Cotopaxi, an active volcano whose terrible reputation makes it the most dreaded object on the plateau. Carrel had to be rather tactfully handled in such matters; but Whymper's casual remarks so strongly stirred him that at last he said, "You have raised within me a great desire to look into this animal." With such mountaineers as Whymper and himself, all that was needed then was to transport themselves thither.

Some of the roads on this plateau were even worse than the mule track up from the coast. At one place, a hole full of liquid mud, "my animal stopped on the brink, unwilling to proceed. Dismounting, I gave it a touch with the whip. It went head first into the slough and emerged on the other side a miserable object, dripping with filth, which for a second had risen above its hind-quarters. This mud hole was about four feet deep, and was the finest we discovered in Ecuador."

Cotopaxi, which is second only to Chimborazo, rises from a sterile dusty plain to a height of more than 19,500 feet. A typical volcanic cone, it offers no difficulty to the climber other than the fatigue of walking up the loose surface without making any apparent impression on it.

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Although on the equator, it was bitterly cold; nightly snowstorms covered the mountain in a sheet of pure white, and the warmth of the rocks transformed this into a mass of brown and black, mingled with patches of steam as the snow melted.

Cotopaxi also emits vast quantities of fine dust and ashes, which fill the air with fog and coat everything for miles around with the rough objectionable substance. At times of paroxysmal rage it boils over, lava streams course down its sides, and floods of water, released by the melting of glaciers near the summit, cause great destruction and sometimes severe loss of life.

Such was the "animal" into which Jean Antoine Carrel desired to see. It taxed none of his skill—in fact, the entire party walked up it; nevertheless, it was a dangerous neighbour, and was examined with due coolness and deliberation. Two camps were formed, one close to the summit and the other 4500 feet below it. The climbers had great difficulty with the tent at the high-level camp, because the loose dust would not permit them to make a level floor, while when they dug too deeply the rocks became so hot as to burn the tent bottom. The weather also was peculiar, with constant thunderstorms and hail, and the wind was so fierce that blocks of

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lava had to be carried up to form some more secure hold for the tent stays.

The little party viewed the crater twice; at first by daylight, when nothing could be seen because of the clouds of steam, and subsequently by night.

“A few minutes after our arrival,” says the leader, “a roar from the bottom told us that the ‘animal’ was alive. . . . When we heard the roar, there was an ‘it is time to be off’ expression clearly written on all our faces.” It turned out to be nothing worse, however, than a cloud of steam.

A rope had been fixed from the tent up to the summit 250 feet distant; aided by this and the glow from above, they went again in the darkness to inspect the monster. The crater was oval, rather less than half a mile in longest diameter; its walls descended vertically into the inferno.

“Cavernous recesses belched forth smoke; the sides of cracks and chasms no more than half-way down shone with ruddy light, and so it continued on all sides, right down to the bottom, precipice alternating with slope, and the fiery fissures becoming more numerous as the bottom was approached. At the bottom, probably 1200 feet below us, and towards the centre, there was a rudely circular spot, about

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one-tenth of the diameter of the crater, the pipe of the volcano, its channel of communication with lower regions, filled with incandescent if not molten lava, glowing and burning; with flames travelling to and fro over its surface, and scintillations scattering as from a wood fire; lighted by tongues of flickering flame which issued from the cracks in the surrounding slopes. At intervals of about half an hour the volcano regularly blew off steam. . . . It appeared to be pure, and we saw nothing thrown out, yet in the morning the tent was almost black with matter which had been ejected."

Their curiosity satisfied, they returned to the tent, and later in the morning descended once more to the plateau.

Cotopaxi had been ascended several times before; but this was the first occasion on which anybody had had the temerity to spend a night on the summit.

Lack of space prevents us from following the enterprising Whymper farther. In the autumn of the same year he returned to Europe, but more than a decade elapsed before he wrote his very entertaining book on this expedition. As to the Carrels, they went back to their beloved mountains, where Jean Antoine died at last, on the Matterhorn which was so closely identified with him; he perished from exhaus-

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tion near the Col du Lion, having successfully got his employer out of the gravest danger, during a severe snowstorm (1890)

From Cotopaxi one may travel generally southwards between mountain walls for more than 2600 miles (a distance twice the length of the Himalayas) before one reaches the culminating peak of the Andes; and yet that mountain, Aconcagua, may plainly be seen on a clear day from the Pacific coast. Aconcagua (23,080 feet) was first climbed by a party led by E. A. FitzGerald, the individual honour resting with the redoubtable Zurbriggen. It was a bitter fight against high-level lassitude and intense cold; for despite its tremendous height the peak (like so many other South American mountains) has few technical difficulties.

FitzGerald took his party thither in 1896, when the Transandine Railway had not yet been completed; but by travelling from Buenos Aires to Mendoza and thence to the summit of the line, mules and goods were transported to within twenty miles of their objective. From this point valleys deeply cut into the mountains lead northwards; the second of them, the Horcones—dreary, barren, swept by wind and dust-storms, and harbouring an uncontrollable torrent

—leads to a glacier of Aconcagua, twelve miles away. Besides FitzGerald and Zurbriggen, the party included Mr. Philip Gosse as naturalist, Messrs. S. M. Vines, De Trafford and Lightbody, and five Swiss porters.

After following a false scent (for the natives seemed not to know which of the mountains around them was Aconcagua), the Horcones Valley was tried, and despite the difficulty of getting mules over its trackless sides, and the impossibility of crossing the icy stream except when the nightly frost had stilled its copious sources, a camp was eventually fixed at its head, 16,000 feet above the sea. On the explorers' right hand was the awful southern face of the mountain, presenting two miles of inaccessible precipice in a single sweep. Towards their left, however, above the glacier, was a high gap some 19,000 feet above the sea; and from that point long slopes of loose stones offered an easy means of reaching the top.

They had not been in the lower camp many hours, when they were nearly all prostrated by mountain sickness. It is curious that Whymper should have been overcome at the same level. They could not even put up their tents, and they slept in their bags in the open, "totally unable to shelter ourselves from the wind which raged about us". This sickness passed away, as

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in Whymper's case; but the killing lassitude remained. It was so intensely cold, too, that two hours of daylight had to be wasted each day, because they could not endure to start until the sun rose above the peak and they were out of its chill shadow.

The next day another camp was pitched 1000 feet higher; and here they spent another miserable night, followed by an equally unhappy Christmas Day. There was no wood on the mountain, and it had not yet proved possible to get any up; they were therefore reduced to eating tins of cold Irish stew, "slowly melting the lumps of white frozen grease in our mouths. The natural result of this was violent fits of nausea."

Despite these difficulties, coupled with the fatigue of toiling over the crumbling slopes, a still higher camp was established, at 18,700 feet. It lay in a hollow, delightfully warm in the sun, and with a view of the ocean 100 miles away; but at night everything was frozen hard. Zurbriggen went on for a further 2000 feet, but returned exhausted. It was impossible to sleep in comfort there, and the place only made its occupants grow weaker. Mr. Vines tells us graphically how he, the most successful member of the party, was affected by the height. He went to get snow to melt water for the coffee.

"The snow and ice were exactly ten yards distant from where I stood near the fire. The guy ropes of the tent stood in my way. I stepped over one of them with one foot and waited, and then I dragged the other leg after the first, and so on until I reached the spot. I was ten minutes gone, and when I got back I had just enough snow and ice to wet the bottom of the kettle!"

Eventually, having failed to maintain themselves up there, they returned to the 12,000 feet camp, down in the Horcones Valley, and the men were set to collecting firewood; meanwhile mapping of the vicinity went forward as a routine job. After this two further attempts were made to ascend the mountain before 2nd January, both from the high camp. On the first occasion Zurbriggen got his feet severely frost-bitten, on the second his employer was reduced to utter exhaustion. Finally they retreated to the 12,000 feet level once more.

On 5th January they returned to their windy eyrie; nine days later they made a fourth attempt to reach the top. This time FitzGerald attained 22,000 feet, but then collapsed; he sent on Zurbriggen to complete the climb, and himself struggled back, more dead than alive, and rolling down because he could not walk. Meantime Zurbriggen plodded on to the top, where

he built a stone man to prove his conquest; but even his immense strength was sapped, and it took him several days to recover from the effects. After this success they went down to the 12,000 feet camp again.

On 19th January, FitzGerald made a fifth attempt, accompanied by Vines, a porter and a muleteer; but he had not sufficiently recovered from the last effort, and they did not even reach their 18,700 feet camp. Once more they started, 22nd January, only to run into a blizzard; and although they reached the high tent, snow and wind imprisoned them there for two nights and a day, during which the gale never stopped. This was more than flesh and blood could bear; and when there came a lull in the storm the party scurried back to the comparative comfort below.

Still FitzGerald would not admit defeat. What the guide had done the amateurs could do. They started on 7th February (having then been more than a month on the mountain), but were by now so feeble that they could not gain the upper camp until the 10th. After a two-days rest in the tent, they made a final attempt on the 13th. FitzGerald, completely beaten, was forced to return at about 20,000 feet, but his companion, Vines, went on, step by step, in the teeth of the wind, and eventually

added his mite to Zurbriggen's cairn. He was accompanied by one Italian porter. Thus was the highest point of the New World surmounted, after a struggle, the difficulty of which could never have been foreseen from its relief.

It is a significant commentary on the arduous nature of pioneer climbs that FitzGerald's friend and former leader, Sir Martin Conway, followed him to the summit of Aconcagua, some two years later, in three days; but to avoid any foolish misunderstanding of his motives he chivalrously stopped short within a few feet of the top.

CHAPTER VIII

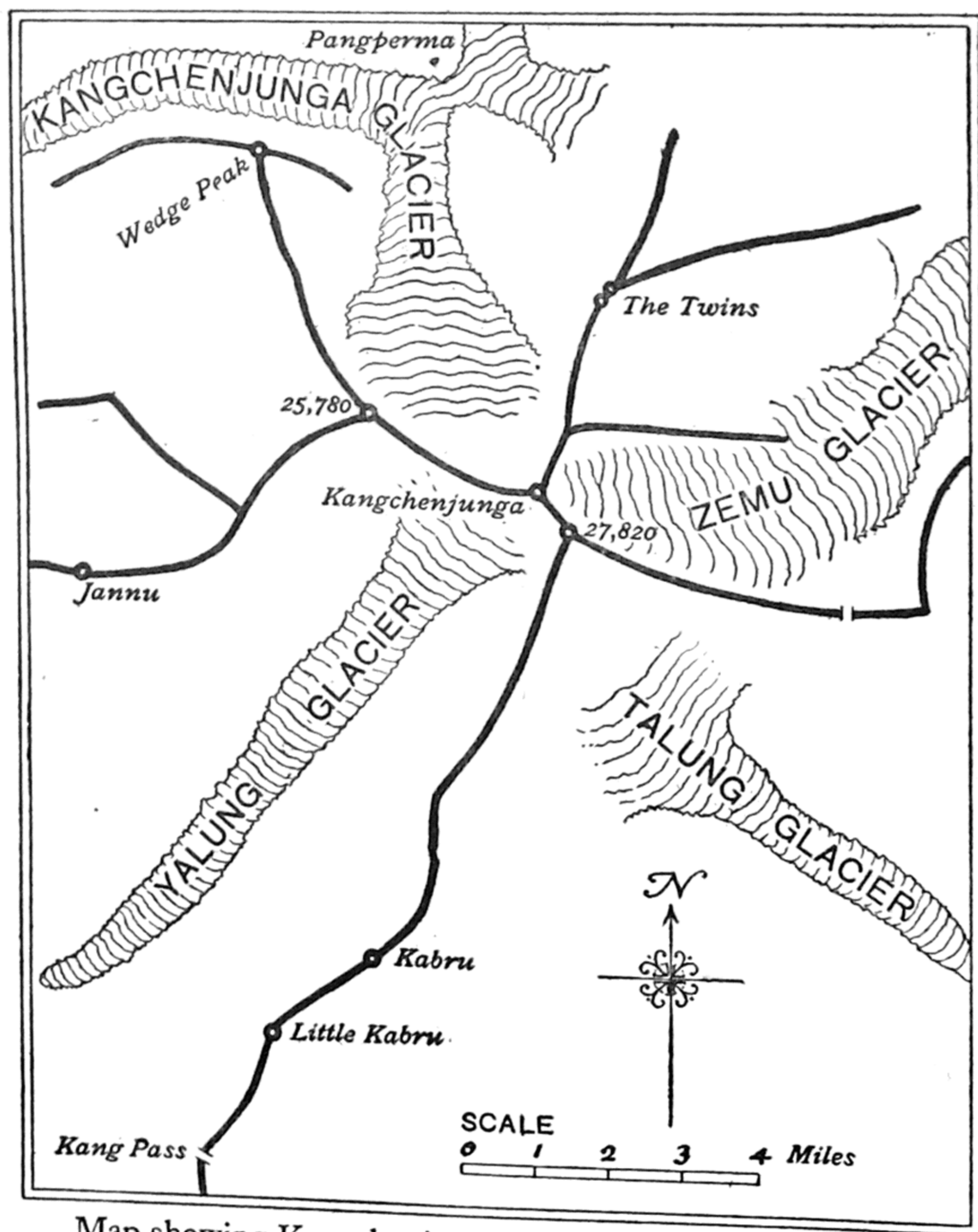
Kabru and Kangchenjunga

Imagine two mountainous ridges arranged in the form of a gigantic cross. All four limbs are long, narrow, sharply serrated, and fronted by terrible precipices and overhanging glaciers, peaks of 22,000 to 24,000 feet being common. From their smooth sides clouds float incessantly as avalanches tumble down to the glaciers which fill up the angles between the four limbs. The glaciers drain away, some into semi-desert glens, others into gorges choked with the most riotous and impenetrable vegetation. At the very apex of the cross a huge spire soars 27,820 feet into the sky; close beside it on the east rises an even higher and more imposing mass to 28,150 feet. Such is Kangchenjunga, in the Himalayas, at once the admiration and despair of every mountain climber.

The southern limb of this singular cross leads to a peak, seven miles off, which is equally famed in mountaineering lore: the glassy-walled Kabru, 24,015 feet high. South of

Kabru and Kangchenjunga 205

Kabru the ridge forks and sinks, being bordered by ravines along which so-called tracks run



Map showing Kangchenjunga and the surrounding features down to Darjiling, fifty miles away. Disregarding all the other mighty peaks of this

region—the terrific wall of Jannu, the beautiful Jonsong Peak, D2 (Siniolchum), and the rest, let us confine our attention to these two mountains, Kabru and Kangchenjunga.

It will be remembered that Mr. W. W. Graham, after his disappointment in the vicinity of Nanda Devi, wended his way towards Darjiling. It was not his first visit; for a few months before in the same year (1883) he had risen early at that picturesque town in order to observe the sunrise. “Suddenly,” he says, “far away in the dark and yet incredibly high in the sky a pale rosy pinnacle stole into light. It was the summit of Kanchenjunga.” Inspired by this first glimpse of the great mountain, he reconnoitred it first from the west and then from the east; but he had hardly entered the charmed circle of peaks around the Zemu Glacier when a terrible snowstorm wrecked the enterprise, and made all further climbing impossible. The return to Darjiling was not without excitement.

“With a crash a bear broke into the path some five yards in front of us. Imboden (his Swiss guide), who had the gun, ran up a tree like a lamplighter, whilst I, being unprotected, fairly turned and bolted. Fortunately for me, the bear broke through the snow, which bore my weight, and after a chase of about 100 yards he gave up.”

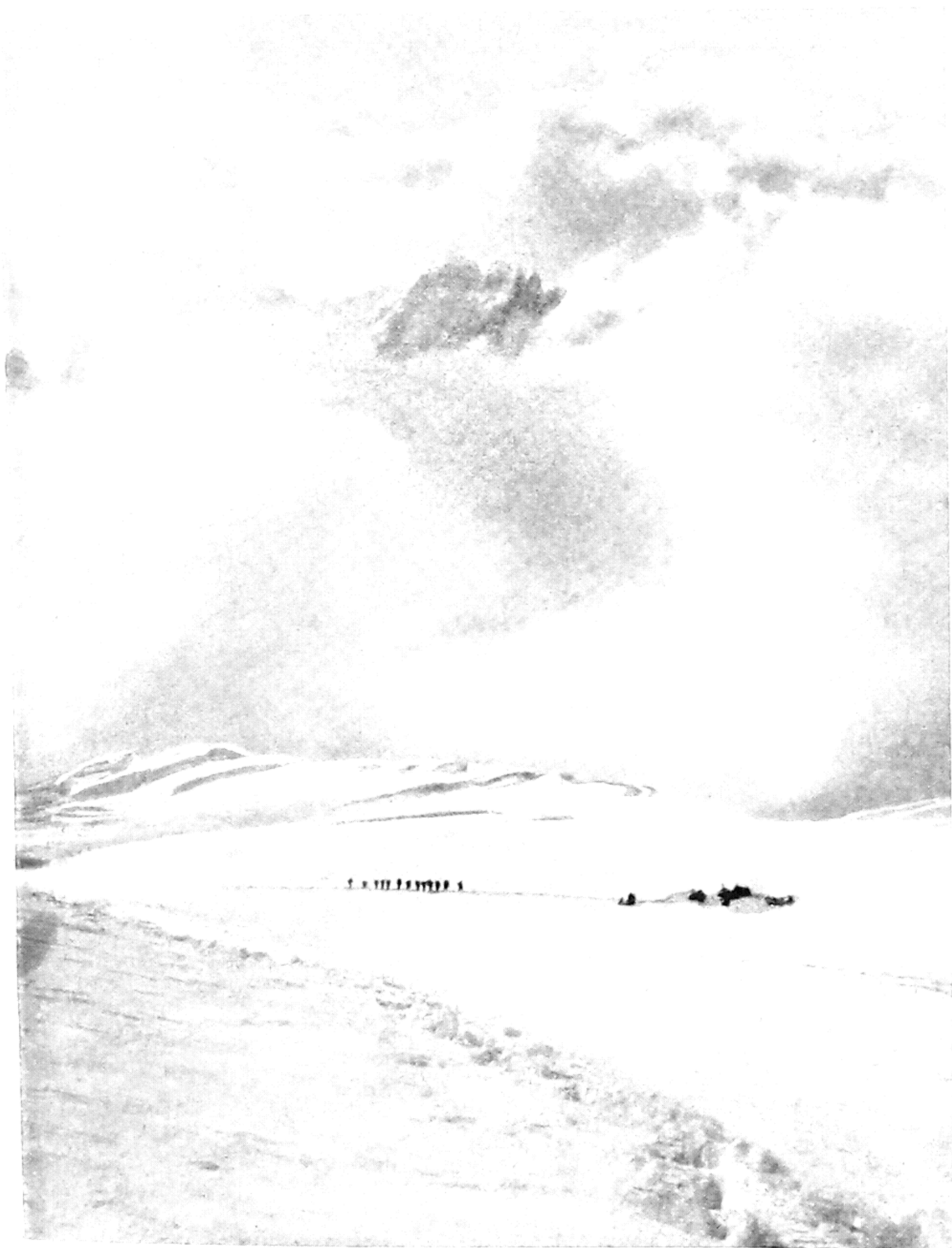
When the discomfited alpinist had regained his rifle the bear was no longer to be seen!

On his second visit to this district, when he was accompanied by the guides Boss and Kaufmann, Graham made his remarkable ascent of Kabru.

He had already seen the western cliffs of that great mountain, and had strongly disapproved of them; so he now confronted it from the east, whence a practicable way to the summit could be discerned. The season was virtually over—it was the 6th October; snow, bitter winds and mist made the prospects anything but pleasant; nevertheless, the attempt was persisted in, and a camp established at the head of the East Kabru Glacier, right under the cliffs of the peak. Next day the mist cleared off, and they seized the opportunity to scale the wall. From below it appeared to afford a continuous route up a ridge to the summit; but from above it was now seen to be separated from the peak by a deep gap. Like Meyer on Kilimanjaro, they had to descend again and work round, until by approaching the mountain from the north the lost height had been regained. The same night they got a Whymper tent up to a ledge at 18,500 feet, which made an excellent jumping-off ground, provided that the weather held good.

Above their eyrie a typical chimney led up to an icy slope; it was covered with the thinnest of snow layers, and required very careful treading lest a slip should carry the whole surface away. In the morning they surmounted this dangerous gully without accident and after a while reached the base of solid rocks; thenceforward for 1000 feet the climbing was easy, being up a sort of natural staircase. At 10 a.m., however, they came to a halt. Above them was an icy cliff, inclined at 45 to 60 degrees, and leading almost to the summit, 1500 feet away. It was covered with snow, which the least pressure might induce to slide, especially during the noonday heat. "I am perfectly aware," wrote Graham, in describing his attack of this cliff, "that it was a most hazardous proceeding, and in cold blood I should not try it again, but only in this state would the ascent have been possible in the time."

After two hours of nerve-racking step-cutting and cautious treading on the snow they reached the summit ridge; nothing now stood between them and victory but "about 300 feet of the steepest ice I have ever seen". It was the summit of Kamet all over again. The difficulty was surmounted, with the exception of a pillar of ice thirty to forty feet high, which even Graham dared not essay.



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Photo. F. S. Smythe

AT THE HEAD OF THE KANGCHENJUNGA GLACIER
A climbing expedition on a snow plateau above the ice-fall

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The view from the top showed a very curious feature. They not only saw Mount Everest seventy miles off, but also two much more distant peaks, which they believed to be higher. These peaks have never been satisfactorily identified.

Now came the descent, requiring the utmost caution and coolness. Fortunately no slip occurred, and they got down in safety, although the last part took place by moonlight.

For twenty-five years this famous climb by Graham constituted the altitude record. It was repeatedly challenged; for his not very thorough description and his casual reference to what must have been very arduous work gave rise to doubts as to whether he had ever ascended the mountain at all; but a strong body of expert mountaineers believed in him. Freshfield, sighting the peak almost twenty years later, believed the feat to be quite possible. Longstaff shortly afterwards showed that other men besides Graham could climb to great heights at a remarkably fast pace. Finally, two Norwegians, Messrs. Aas and Rubenson, actually climbed Kabru *without guides* in 1907, gaining the summit ridge at 23,800 feet. These circumstances seem to place Graham's fame beyond question. His trouble was that he was daring beyond his age; he climbed at a time when

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anything above 20,000 feet excited only incredulous smiles.

Although only eight miles north of Kabru, Kangchenjunga is infinitely more difficult of access, especially to laden coolies. It had been reconnoitred long before Graham's time by the celebrated botanist and geographer Sir Joseph Hooker; but it was not until 1899, when D. W. Freshfield and E. J. Garwood visited it, that anything like an accurate map of the region was procured.

It will be recalled that the peak stands almost at the apex of a great mountain cross, each of the angles between the limbs holding glaciers; of these ice streams the most important to us are the Kangchenjunga Glacier, on the north-west, and the Zemu Glacier on the north-east. The former leads down to a typical south Tibetan valley, beyond which at least two difficult passes have to be crossed before one comes back to the Darjiling "road"; the worst pass, the Kang, leads over a glacier astride the southern limb of the cross, not far from Kabru. The other ice stream, the Zemu, conducts to the hot and extremely unhealthy gorges of the Teesta, where malaria-carrying mosquitoes vie with poisonous flies and matted vegetation in making the traveller's life a burden.

Freshfield, who was then in his fifty-fifth

year, first followed the Teesta route to the Zemu, accompanied by a steadily dwindling band of coolies; but the explorers had hardly established themselves at the foot of the Zemu Glacier, after five days of cutting a way through rhododendron ropes, when they experienced a curious repetition of Graham's misfortunes.

Freshfield and Garwood had gone up the glacier, and had stood under the awe-inspiring and inaccessible eastern face of the mountain. They contemplated moving their camp up, when clouds suddenly gathered, the air became uncannily still and close, and they needed no further warning of an approaching storm. The snow descended upon them ere they could regain their tents; and they were compelled to remain under the frail canvas for forty-two hours, during which it never ceased. They then beat a retreat, with the snow still following them; conscious that high climbing was now impossible, but determined not to lose the fruits of their journey entirely.

Subsequently the weather improved, enabling them to make a complete circuit of the peak. Freshfield, standing on the rubbish-covered Kangchenjunga Glacier, soon realized that the best chance for a climbing party lay on that side. Above the head of the glacier a succession of huge terraces led up to the final pyramid;

each terrace being sheeted with ice and overhung by glaciers, a grave danger at all times through the incessant dislodgment of avalanches. At the east end of this series a ridge led northwards to two much smaller summits, called the Twins; and if this ridge could be gained, a camp might be placed there, and further advances made towards the crest of Kangchenjunga. On all other sides the peak appeared impossible; not only did its faces rise like walls, but they were battered by tumbling rocks and ice; and even where the angles seemed to afford desperate climbers a chance, there was every likelihood of disaster should bad weather overtake them while on the ridge.

In subsequent years Dr. Kellas hovered fitfully around the Sikkim giant, never getting on to its actual mass, but making several very notable climbs in the vicinity. As a result of his patient work, Garwood's map was considerably improved.

The Great War diverted the thoughts of men of action into other channels, but the years 1920-4 saw a remarkable revival of interest in high mountains; for this period comprised the three attacks on Mount Everest, the last of which justifies the often abused word "epic". The attempt to climb Everest, a purely æsthetic performance, was a very fine example of co-

ordinated human effort. It had another aspect, however; for it gave rise to new studies of the effects of high levels and the means of overcoming them. Captain Finch, combining the practice of the climber with the theory of the scientist, worked out a new technique involving, what few besides the Duke of the Abruzzi had formerly practised, the use of oxygen; and other factors came into play. It was now seen that attempts to climb the highest peaks must be elaborately organized, involving large parties and considerable expense. The men must be prepared to spend weeks at great heights, ready to seize any chance of overcoming their antagonist; and the climbers must be held in reserve, the routine work falling as far as possible on those who were not to carry out the assault. To get food and creature comforts up to high levels means a vast expenditure of effort in organizing and leading coolie caravans; thus transport officers came into being, who (although indispensable to the expedition) might never see the peak for the conquest of which they were striving.

This was the spirit which the third Everest failure left among the climbing fraternity. It led to two notable expeditions against the more accessible giant Kangchenjunga, in 1929 and 1930. The former was a reconnaissance, by a

party of Germans, late in August and September, and it was wrecked by bad weather. The latter had an international flavour, but it came to the same end, after most determined efforts to scale the gleaming precipices had closed in a disaster.

The 1930 expedition was led by Professor Dyrenfurth, whose courageous wife elected to brave the discomforts of the work with him. Besides a goodly contingent of expert alpinists (including the bold F. S. Smythe), British transport officers undertook the onerous and often exasperating work of getting coolies over the Kang Pass. The season was a good one—April and May, i.e. before the monsoon. Every detail was thought out beforehand. Rubber mats and double sleeping-bags minimized the rawness of the Tibetan nights on ice. Food in ample quantity and variety was successfully carried up to the north-west face of the peak. Yet despite everything the main peak of Kangchenjunga remained untouched.

On 26th April, 1930, the head of the column, clambering over the slippery and treacherous rocks that mask the Kangchenjunga Glacier, established a base camp at Pangperma, a small pasture 17,200 feet above the sea. Before their tent doors ice avenues stretched in three directions. Right opposite was a beautiful summit, which they christened Wedge Peak. At the

head of one of the avenues the Jonsong Peak frowned down upon them; at the head of another, and six miles distant, was Kangchenjunga. The conditions were almost Arctic; the first night they had 30 degrees of frost.

On 30th April, the leader, with Messrs. Smythe and Wood Johnson, Kurz, Wieland, the cinematographer Duvanel, and porters, started up to establish a camp (Camp I) in the middle of the glacier. Three days later a second camp was pitched at the foot of an ice-fall, 18,000 feet above the sea. The air, coupled with the difficulty of respiration, badly affected the throats of several climbers; and from this point Kurz and Dyrenfurth were forced to return to the base. Meanwhile Smythe and the rest, having found a way to outflank the ice-fall, moved the second camp up to a snowy plateau above it, some 20,000 feet high.

They then spent several days reconnoitring the broken cliffs referred to above. On 5th May, Wood Johnson, Smythe, and Wieland began to cut steps up this difficult place; and now the difficulties of work at great altitudes became apparent. The climbers lost strength in work which nobody else could do, but which was yet essential if laden porters were to establish a higher camp. Iron stakes were driven into the wall, and ropes were fixed; while at one

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place, where the ice overhung, it was necessary for the men to stand on each other's shoulders, fix a wedge and an iron ring as high as they could reach, and then, tying a rope round a comrade's waist and passing it through the ring, haul him into a position such that he could place a still higher wedge; and so on. Deadly enough work, this, with several hundred feet of sheer cliff beneath one, less than half one's normal supply of oxygen, and a biting wind making the ears and fingers tingle!

By 9th May the stairway was in such a condition that it could be attempted by the porters; and while Smythe rested at Camp II a party of four climbers with as many porters set out to build a third camp above the ice-wall. They had not gone far, however, and were providentially not on the face of the mountain, when an enormous avalanche broke away far above, and roaring down upon them, enveloped men, loads, and everything in a great cloud of snowy dust. They ran for their lives, and all got clear but two. Schneider, one of the climbers, was caught by the advancing wall, yet he miraculously escaped harm; but the chief porter, Chettan, was overwhelmed and was crushed to death. The avalanche rolled on to within 300 yards of the tent whence Smythe had just emerged. When the dust cleared away,

the true extent of the disaster became apparent. Not only had a valuable life been lost, but the entire labour bestowed on the ice-wall went for naught; steps, irons, ropes, all were obliterated. The narrowness of their escape convinced them all that this route must not be attempted again.

They then moved their camp across the glacier, and made a last desperate attempt to get on the mountain by way of the western limb of the cross. After cutting steps up an ice-lined gully, fixing ropes for coolies, and breaking a way through a cornice at the top, they gained the western ridge. This was the first definite success they had had. It was followed by an attempt to ascend the ridge, with the Kangchenjunga Glacier far below on their left hand and the valleys leading to India on their right. They were soon pulled up by impossible conditions—rotten knife-edges, followed by unscaleable cliffs. All further attempts on the peak were then abandoned. The Dyrenfurth Expedition, costly and elaborate as it had been, had but confirmed what Freshfield said thirty years before: Kangchenjunga is inaccessible.

BRIEF BIOGRAPHIES OF SOME CELEBRATED CLIMBERS MENTIONED IN THIS VOLUME

Brig.-Gen. the Hon. Charles Granville Bruce is an officer whose exploits, both in the military and mountaineering fields, have been mainly upon the Indian frontier. He is the youngest son of 1st Baron Aberdare, and was born 7th April, 1866. He entered the army; saw much fighting in the frequent frontier wars; and has always been associated with the Gurkha Rifles. In his climbs those hardy little hillmen have usually participated. From his early connexion with Conway's crossing of the Hispar Pass, when he led one party of the explorers, down to the Everest Expeditions, of which he was the head, he has constantly promoted the study of the Himalaya, both by his own climbs and by supporting and promoting the climbs of others. In the famous Everest Expeditions of 1922-4 he organized and kept going the vitally important transport, although he did not participate in the actual ascents, since he was then close on 60 years of age.

Sir Wm. Martin Conway, the son of a Canon of Westminster, was born at Rochester, 12th April, 1856. Educated at Cambridge, he studied art and archæology; and after a period of lecturing he became Professor of Art

in the Liverpool University. In 1889 he went to Egypt, the commencement of his world-wide travels. In 1892 he crossed the Hispar Pass and climbed Pioneer Peak, as we have seen. Two years later he conceived the idea that the only way in which to *understand* a mountain range was to traverse it literally from end to end; this gave rise to his famous Alpine journey, followed by a still more famous book, *The Alps from End to End*. In 1895 he was knighted. Next year his restless spirit took him to Spitsbergen. He made a remarkable crossing of that desolate island; his associates, Messrs. E. J. Garwood and J. W. Gregory, afterwards became celebrated geologists, and Conway himself has always displayed a keen eye for peculiar features of physical geography. In 1898 he travelled over the central and southern Andes, ascending the great peaks Sorata and Illimani, and following FitzGerald to the top of Aconcagua. To his many interests he subsequently added another when he entered politics; and he has been a Member of Parliament (for the Combined English Universities) since 1918.

Douglas William Freshfield is the Grand Old Man of Alpine climbing, for at the time of writing he is in his 87th year. He was born at Kidbrooke Park, Sussex, 27th April, 1845. His maternal grandfather had been a notable traveller in the Alps, and the grandson, although destined for the Law, followed him. In 1869, after wandering through the Near East, he made his first acquaintance with the Caucasus, as already noted; just forty years later he saw Kangchenjunga. He has also travelled in many other parts of the world, his most notable performance, perhaps, being an attempt when sixty years old to get to the top

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of Ruwenzori. Mr. Freshfield has been President both of the Alpine Club (1893-5) and the Royal Geographical Society (1914-7), besides a Secretary of the latter for many years. His numerous books breathe the spirit of the mountains with which he has been so long identified.

Sir Harry Hamilton Johnston was a Londoner, born 12th June, 1858. For a political administrator he had a strange beginning, since he studied painting and architecture. He went to Tunis in 1879, and most of his life thereafter was spent in Africa, where a keen colonizing instinct, a fixed ambition to see large slices of the Dark Continent administered under the British flag, and an admirable ability to handle the blacks, brought him great renown. His two outstanding performances in this direction, perhaps, were the organization of the Niger Territory, which was taken over by the Royal Niger Company, and the administration of British Central Africa; but Angola, the Congo, Nyasa, Mombasa, all saw much of this indefatigable man. He was greatly interested in the native languages, of which he made a wide study. Apart from the Kilimanjaro Expedition, Sir Harry Johnston's most noteworthy contribution to geography was an effort to ascend Ruwenzori, and an exploration of the Upper Congo. He was created G.C.M.G. in 1901. He died 31st July, 1927.

Sir Harry Johnston was a Pioneer of Empire in the broadest sense, and will always be closely identified with the development of British interests in Africa. Several of his books are published in Messrs. Blackie & Son's "Pioneer Library".

Tom George Longstaff, Honorary Secretary of the Royal Geographical Society, was born 15th January, 1875.

He is the son of Lt.-Col. Longstaff, himself a notable patron of geographical enterprise. Dr. Longstaff embraced medicine as a profession, but mountaineering has always been a second love. Prior to the events narrated in this volume (when he scaled Trisul), he had already done much climbing in the Alps, Caucasus, and Himalaya, including a desperate attempt to ascend Gurla Mandhata. Subsequently he again attacked the Himalaya on several occasions, discovering a new peak of the first order (Teram Kangri), and participating in the attempt to scale Mount Everest. Whereas Mr. Freshfield has always been attracted by the æsthetic side of mountain scenery, Dr. Longstaff has paid diligent attention to its physical aspects—its anatomy, in fact.

Horace Benedict de Saussure was born at Geneva in 1740. He was a brilliant scholar and became professor of Natural Philosophy at Geneva when only 22. His travels in the Alps were directed to the understanding of mountain structure, and he popularized (although he did not coin) the word “geology”. The results of his seven journeys among the Swiss Peaks were published in 4 vols., 1779–96, as *Voyages dans les Alpes*. This book may be said to have created scientific mountaineering. De Saussure died in 1799, at the early age of 59.

John Tyndall was an Irishman, born in Carlow, 2nd August, 1820. At first an assistant on the Ordnance Survey, he transferred his services to the railway promoters when the great boom in railway building arose in England. He was always interested in physics, and he saved enough money to pay for his education during two years at Marburg University. Afterwards some researches in magnetism

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earned him the coveted election to the Royal Society. He was appointed Professor of Natural Philosophy at the Royal Institution in 1854, where he worthily carried on the tradition of Thomas Young and Michael Faraday. Quite apart from his mountaineering exploits, Tyndall endeared himself to a wide public by his manliness, loyalty to friends, and fearless love of truth. He was one of the very greatest teachers of what we now call "popular science".

Tyndall's love of the heights was so great that he had a hut built on the Bel Alp, Switzerland, where he spent the summer months during many years. In England his home was among the steep slopes of Hindhead; and there he died, 4th December, 1893.

Edward Whymper, as already stated, was an artist, and the son of one. He was born in London, 27th April, 1840, being thus twenty years younger than his rival on the Matterhorn. Apart from the adventures recorded in this volume, Whymper paid two visits to Greenland (1867 and 1872); while he also travelled in the Canadian Rocky mountains, 1901-5, but he published nothing on that most fascinating region.

He was extremely thorough, as his few books bear witness. His artistic sketches, combining vivid effect with real adventures, are famous, and are well shown in his book, *Scrambles among the Alps*.

Whymper died at Chamonix, and was buried there, surrounded by the peaks with which his proud spirit had battled, 16th September, 1911.

William Hunter Workman, an American medical man, was born at Worcester, Mass., 16th February, 1847,

of English-American parents. He retired through ill-health, and with his courageous wife, Mrs. Fanny Bullock Workman, made a cycle tour through India. This was followed by the exploration of the Biafo, one of the five great Karakoram Glaciers; then by the Chogo Lungma journeys at which we have glanced; then by a thorough study of the Hispar, the Baltoro, and the Rose Glacier. The latter, 52 miles long, had been discovered and largely traversed by Longstaff a year or two earlier, but it was the Workmans who mapped it. Mrs. Workman still stands supreme among lady mountaineers. She died in 1925.

A BRIEF GLOSSARY OF MOUNTAINEERING EXPRESSIONS

Alpenstock, a steel-pointed ash stick.

Arête, a ridge occupying the angle between two sides of a mountain: generally steep and narrow.

Bergschrund, the crack or crevasse at the head of a glacier, between the ice and the mountain-side.

Cairn, a pyramid of stones erected to mark a summit or other prominent point, or to indicate a route. Sometimes called a Stone Man.

Chimney, a steep and narrow slit or crack in the face of a cliff.

Cirque, the amphitheatre at the head of a glacier; usually bordered by a bergschrund.

Col, a gap or high pass between two peaks.

Comb, a ridge or crest which is much cut up or serrated.

Cornice, an overhanging crest of snow which frequently forms along the crest of a ridge or summit.

Couloir, a steep gully.

Crevasse, a crack in a glacier.

Gendarme, a rock pillar on an arête.

Glacier Table, a rock on a glacier, perched on a pillar of ice.

Ice-axe, an ash stick bearing at one end an adze head for cutting steps in ice or hard snow, and at the other a spike.

Ice-fall, a chaos of blocks, towers and crevasses on a glacier, where the rock bed underneath drops suddenly.

Kamm, see "Comb".

Moraine, earth and rock fragments transported by a glacier. *Lateral* moraine is at the side, *terminal* moraine at the snout end, and *medial* moraine in the middle of the glacier.

Névé, a snow basin, usually the commencement of a glacier.

Sérac, a tower or pillar of ice, arising where it encounters unusual pressure, or where the rock floor suddenly drops below the glacier.

Stone Man, see "Cairn".

